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SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

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Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF
MAR. 1, 1960

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UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
COLORADO AND STATE OF UTAH	MONTHLY (JAN.-MAY)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA AND STATES OF IDAHO AND ALASKA	MONTHLY (JAN.-MAY)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA	MONTHLY (FEB.-MAY)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1, APR. 1, MAY 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ARIZONA	SEMI-MONTHLY (JAN. 15 - APR. 1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOCIATION ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
NEVADA	MONTHLY (FEB.-APR.)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-MAY)	PORTLAND, OREGON	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-MAY)	SPOKANE, WASHINGTON	WASH. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

Copies of these various reports may be secured from:

Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

REPORT	ISSUED	AGENCY
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIFORNIA DEPT. OF WATER RESOURCES, SACRAMENTO, CALIFORNIA

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FEDERAL-STATE-PRIVATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS
for
MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared By:

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U. S. Department of Agriculture
Soil Conservation Service
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Montana Agricultural Experiment Station
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Report Issued By:

H. D. Hurd
State Conservationist
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Montana Agricultural
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R. E. Huffman
Director
Montana Agricultural
Experiment Station

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MONTANA WATER SUPPLY OUTLOOK
as of
March 1, 1960

The 1960 Water Supply Outlook for Montana is FAIR. Current snow surveys indicate that Statewide the snow-pack is 70 percent of last year's and 80 percent of the 15-year average.

In the Missouri River Basin the Beaverhead-Jefferson watershed has a snow-pack equal to 84 percent of last year's and 77 percent average. On the Madison-Gallatin watersheds the present snow-pack is 70 percent of last season and 66 percent average. In Yellowstone Park and other tributary basins to the Yellowstone River, the March first snow-pack is 66 percent of March first 1959 and 65 percent average.

The average snow cover over the Columbia River Basin in Montana is 76 percent of March first 1959 and 80 percent average. Over the Northern portion of this basin the Flathead River watershed is covered with a snow-pack that is 76 percent of last year's and 93 percent of the 15-year average. The Clark Fork watershed is covered with a snow-pack that is 73 percent of last year's and 84 percent average.

Reservoir storage throughout the State is very close to average with no acute shortages. Streamflow conditions have been considerably above average during the fall and winter months. This factor, together with above-average fall precipitation, will result in larger volumes of streamflow than would normally be expected from the size of the snow-pack.

INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Range Long.	Record Began	Measuring Dates	Measured By
MISSOURI RIVER DRAINAGE								
JEFFERSON RIVER								
(ROCK-BEAVERHEAD)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	10
Limekiln	12E2	6950	5	15S	9W	1948	3,4	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1
(HORSE PRAIRIE)								
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1
Lemhi Pass	13E1	7480	9	10S	15W	1948	3,4	1
Terrell Creek	13D12	6650	14	9S	15W	1948	3,4	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1
Selway Junction	13D11	6800	27	8S	15W	1948	3,4	1
(BIG HOLE)								
Big Hole Pass	13D3	7240	28	3S	18W	1948	3,4	1
Big Hole Pass-Be.	13D4	6900	24	3S	18W	1948	3,4	1
East Boundary	13D5	6700	22	3S	17W	1948	3,4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	1,3
Jahnke Creek	13D8	7340	25	7S	16W	1948	3,4	1
Miner Forks	13D6	7300	24	6S	17W	1948	3,4	1
Miner Lake	13D7	6720	10	6S	16W	1945	3,4,5	1
(WISE RIVER)								
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1
Elk Horn	13D15	8450	15	4S	12W	1935	3,4,5	3
Wise River	13D13	6300	15	2S	12W	1948	3,4	1
(RUBY RIVER)								
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1
MADISON RIVER								
Hebgen	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6
GALLATIN RIVER								
Devil's Slide	10D4	8100	14	5S	6E	1935	2,3,4,5	2,1
Hood Meadow	10D3	6600	22	4S	6E	1935	2,3,4,5	2,1
New World	10D1	6700	24	3S	6E	1939	1,2,3,4,5	7
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3
Crystal Lake	9C1	6100	19	12N	18E	1941	3,4	1,2
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3
Picnic Grounds	12C6	6500	10	5N	6W	1941	2,3,4	4
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3
(TETON RIVER)								
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1
West Fork	12B1	6000	6	25N	9W	1948	3,4	1
(SUN RIVER)								
Benchmark	12B8	5500	9	20N	10W	1948	3,4	1
Cabin Creek	12B6	5400	33	23N	10W	1949	3,4	1,2
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1,2
Gates Park	12B5	5300	31	24N	10W	1949	3,4	1,2
Goat Mountain	12B7	7000	20	22N	10W	1934	3,4	3
Wrong Ridge	12B3	6800	17	25N	10W	1949	3,4	1,2
Wrong Creek	12B4	5700	32	25N	10W	1949	3,4	1,2
(MARIAS RIVER)								
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
(MILK RIVER)								
Rocky Boy	9A1	5200	15	28N	16E	1941	3,4	7
(MUSSELSHELL RIVER)								
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Range Long.	Record Began	Measuring Dates	Measured By
MISSOURI RIVER DRAINAGE (cont.)								
(UPPER YELLOWSTONE)								
Camp Senia	9D1	7890	2	8S	18E	1937	4	1
Canyon	10E3	7750	44°-44'		110°-30'	1938	1,2,3,4,5	6
Cooke City	10D7	7400	25	9S	14E	1937	1,2,3,4,5	6
Crevice Mt.	10D5	8400	22	9S	9E	1935	3,4	2
Independence	10D6	8000	22	7S	12E	1940	3,4	1
Lake Camp	10E4	7850	44°-34'		110°-24'	1936	1,2,3,4,5	6
Lupine Creek	10E1	7300	44°-54'		110°-37'	1938	1,2,3,4,5	6
Lodgepole	9E1	8200	32	56N	106W	1940	2,3,4,5	1,4
West Rosebud	9D2	7500	10	7S	16E	1960	1,2,3,4,5	4
(SHIELDS RIVER)								
Porcupine	10C3	6500	10	4N	10E	1938	3,4	1
LOWER YELLOWSTONE								
(WIND RIVER) Wyoming								
Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1
Brooks Lake #3	10F8	9200	23	44N	110W	1939	2,3,4,5	1
Burroughs Creek	9F4	8800	15	43N	107W	1948	2,3,4,5	1
Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1
Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	1
DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1
East Fork	9F13	9200	23	44N	104W	1956	2,3,4,5	1
Geyser Creek	9F7	8500	12	41N	108W	1948	2,3,4,5	1
Little Warm	9F8	9500	24	41N	108W	1948	2,3,4,5	1
Sheridan R.S. #1	9F5	7500	3	42N	109W	1939	2,3,4,5	1
Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1
T-Cross Ranch	9F3	8000	1	43N	107W	1940	2,3,4,5	1
Togwotee Pass	10F9	9600	29	44N	110W	1936	2,3,4,5	11
(POPO AGIE RIVER) Wyoming								
Blue Ridge	8G2	9500	23	31N	101W	1939	2,3,4,5	1
Bruce's Camp	8G5	6500	24	32N	101W	1955	2,3,4	1
Hobb's Park	9G3	10000	22	2S	3W	1948	2,3,4,5	1
Mosquito Park R.S.	9G4	9500	23	2S	3W	1940	2,3,4,5	1
Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	1
South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	1
St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1
Trout Creek	9G2	8400	5	2S	2W	1948	2,3,4,5	1
(OWL CREEK) Wyoming								
Beavers Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1
Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1
(GREYBULL RIVER) Wyoming								
Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1
Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1
Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1
Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1
(SHOSHONE RIVER) Wyoming								
East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6
Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6
(NOWOOD CREEK) Wyoming								
Cold Springs Camp	7E25	8700	1	50N	88W	1956	2,3,4,5	1
Medicine Lodge Lks	7E24	9500	7	51N	87W	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Tensleep Lake	7E26	9075	33	50N	86W	1956	2,3,4,5	1
Tensleep R.S.	7E7	8300	30	49N	86W	1935	2,3,4,5	1
Tyrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	1
(SHELL CREEK) Wyoming								
Bald Mountain	7E21	9600	33	56N	91W	1956	2,3,4,5	1
Beaver-Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Granite Creek Camp	7E22	7800	15	53N	89W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1
Horse-Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Ranger Creek	7E4	8800	32	53N	88W	1935	2,3,4,5	1
Shell Creek	7E23	9600	12	52N	88W	1956	2,3,4,5	1
(PORCUPINE CREEK) Wyoming								
Five Spgs. Falls	7E31	7500	19	56N	92W	1956	2,3,4,5	1
Medicine Wheel	7E30	9000	24	56N	92W	1956	2,3,4,5	1
(TONGUE RIVER) Wyoming								
Beaver Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Big Goose #1	7E2	7700	4	53N	86W	1935	2,3,4,5	1
Big Goose #2	7E32	7700	4	53N	86W	1955	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Burgess R.S. #1	7E1	7900	36	56N	89W	1950	2,3,4,5	1
Burgess R.S. #2	7E33	7900	36	56N	89W	1955	2,3,4,5	1
Dome Lake #1	7E3	8800	11	53N	87W	1950	2,3,4,5	1
Dome Lake #2	7E34	8800	11	53N	87W	1950	2,3,4,5	1
Gloom Creek	7E14	9300	32	55N	87W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Range Long.	Record Began	Measuring Dates	Measured By
MISSOURI RIVER DRAINAGE (cont.)								
(TONGUE RIVER cont.)								
Horse Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Lake Geneva	7E16	9000	7	52N	86W	1956	2,3,4,5	1
North Tongue	7E15	8800	17	55N	89W	1956	2,3,4,5	1
Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1
Sucker Creek	7E12	9000	19	55N	87W	1956	2,3,4,5	1
Steamboat Point	7E10	7500	32	56N	87W	1956	2,3,4,5	1
Wood Rock G.S.	7E13	8500	3	54N	88W	1956	2,3,4,5	1
(POWDER RIVER) Wyoming								
Crazy Woman	6E2	8200	6	47N	84N	1956	2,3,4,5	1
Muddy Creek O.S.	6E1	7800	2	48N	84N	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
Sour Dough	7E6	8500	17	49N	84W	1936	2,3,4,5	1
COLUMBIA RIVER BASIN								
KOOTENAI RIVER								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5½	1,2
Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5½	1,2
FLATHEAD RIVER								
Basin Creek	13B14A	5000	11	19N	12W	1951	2,3,4,5	2
Big Creek	13B3	6750	6&7	22N	18W	1941	3,4,5	5
Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
Hell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	1,2
Holbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	2
Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	2
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
Quintonkon	13A13	3800	11	26N	17W	1951	2,3,4,5	1,2
Spotted Bear Mt.	13B2M	7000	23	25N	15W	1948	3,4,5	1,2
Strawberry Lake	13A10	6500	11	28N	19W	1948	3,4,5	2
Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	2
Trout Lake	13A12M	3600	21	28N	17W	1948	3,4,5	1,2
Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1,2
Upper Holland Lk.	13B5	7000	28	20N	16W	1948	3,4,5	2
CLARK FORK								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Black Pine	13C13	7100	25	8N	15W	1960	3,4,5	1
Coyote Hill	13B10	4200	12	18N	16W	1952	1,2,3,4,5	2
El Dorado Mine	13C9	7800	23	8N	12W	1949	4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Freezeout Summit	15B10	6800	21	15N	27W	1937	4,5	2
Gold Creek Lk.	13C10	7200	14	8N	12W	1949	4	1
Hoodoo Creek	15C1	6200	9	14N	27W	1937	4,5	2
Intergaard	13C4	6450	6	5N	13W	1936	2,3,4	4
Lubrecht Forest #6	13C8	4400	11	14N	15W	1951	1,2,3,4,5	12
North Fork Jocko	13B7	6330	3	17N	17W	1941	3,4,5	5
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Red Lion	13C12	7000	27	6N	13W	1958	3,4,5	1
Slide Rock Mt.	13C2	7100	35	10N	16W	1937	4	1
Southern Cross	13C5	6500	8	5N	13W	1936	2,3,4	4
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Storm Lake	13C7	7780	19	4N	13W	1939	2,3,4	1
Stuart Mill	13C6	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C1	7400	6	14N	18W	1936	4	1,2
TV Mountain	14B1	6800	33	15N	19W	1956	1,2,3,4,5	1
BITTERROOT RIVER								
Ambrose	13C16	6475	28	9N	18W	1960	3,4,5	1
East Fork R.S.	13D1	5400	16	2N	17W	1937	4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	3,1
Lolo Pass	14C5	5230	16	38N	15E	1956	3,4,5,5½	2
Lost Horse	14C7	5940	5	4N	23W	1960	3,4,5	1
Nez Perce Camp	14D2	5580	19&20	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D1	6575	32	28N	17E	1937	1,2,3,4,4½,5,5½	1
Powell R.S.	14C6	4230	33	37N	14E	1956	3,4,5,5½	2
Skalkaho Summit	13C3	7259	30	6N	17W	1937	4	1
Twin Lakes	14C8	6510	32	5N	23W	1960	3,4,5	1
SASKATCHEWAN RIVER BASIN								
ST. MARY RIVER								
Iceberg Lake #3	13A3	5600	48°-50'		113°-43'	1922	5	
Josephine Upper	13A15	5000	48°-50'		113°-42'	1956	5	3,9
Josephine Lower #9	13A14	4900	48°-47'		113°-41'	1955	5	
Mount Allen #7	13A7	5700	48°-46'		113°-41'	1922	5	3,9
Piegan #6	13A6	5500	48°-46½'		113°-41¼'	1922	5	3,9
Ptarmigan #8	13A8	5800	48°-50'		113°-44'	1937	5	3,9

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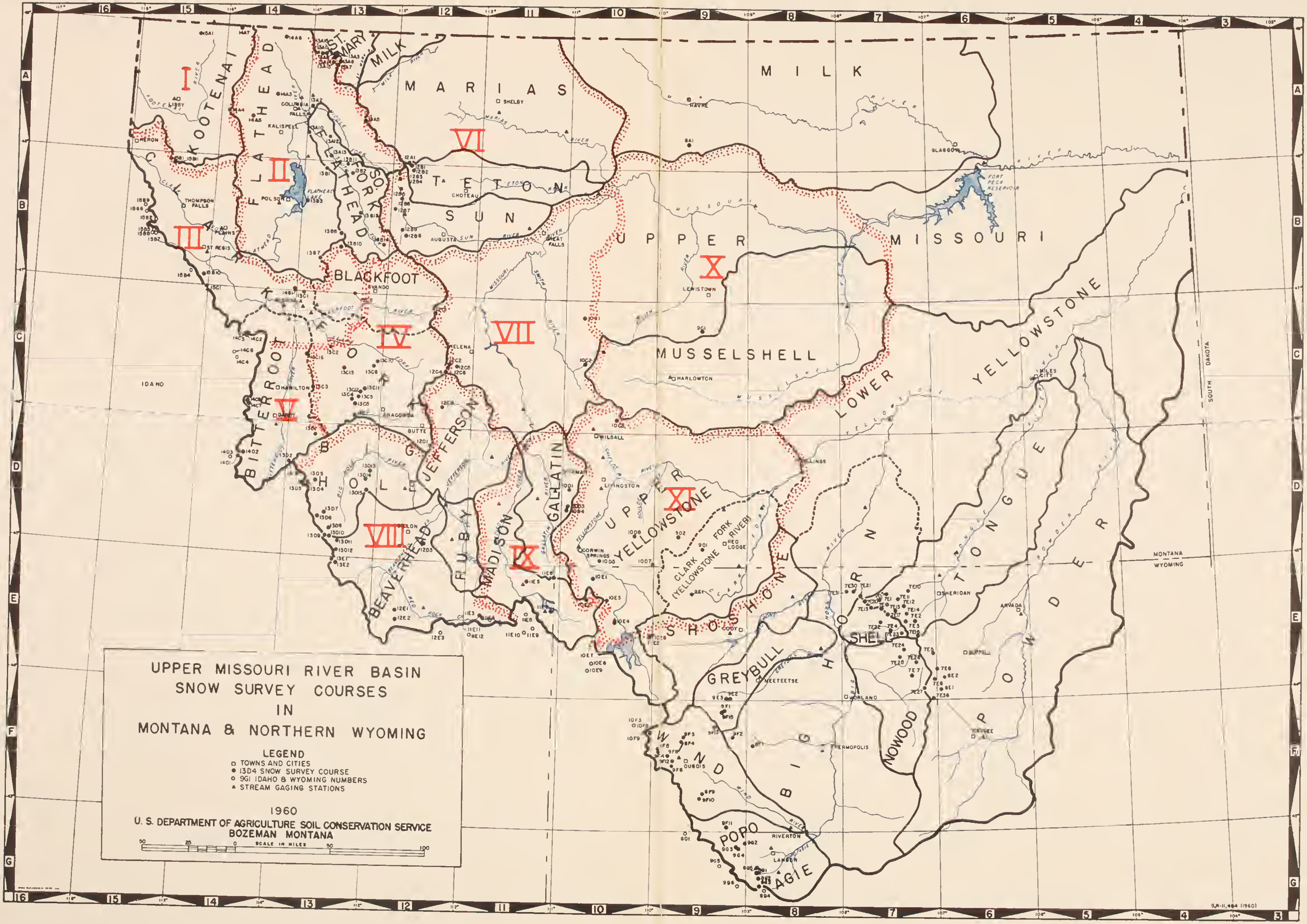
a. Numerals 1,2,3,4 and 5 refer to January 1, February 1, March 1, April 1 and May 1.

b. Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. City of Bozeman
9. Dominion Water & Power Bureau
10. U. S. Fish and Wildlife Service
11. U. S. Bureau of Reclamation
12. Montana State Forestry School

M - Soil Moisture
A - Aerial Marker

5,R-11,684 - (1960)



UPPER MISSOURI RIVER BASIN
SNOW SURVEY COURSES
IN
MONTANA & NORTHERN WYOMING

LEGEND
- □ TOWNS AND CITIES
- ● 13D4 SNOW SURVEY COURSE
- ○ 9G1 IDAHO & WYOMING NUMBERS
- ▲ STREAM GAGING STATIONS

1960
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN MONTANA

COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds March 1, 1960

TRIBUTARY WATERSHED	No of Courses Averaged	No. Years Used	1960 Snow Water Equivalent Expressed as Percent of 1959	1960 Snow Water Equivalent Expressed as Percent of Average
COLUMBIA RIVER BASIN IN MONTANA				
Kootenai above Libby	12	7-15	83	80
Flathead	20	7-15	76	93
Lower Clark Fork	6	5-15	71	77
Upper Clark Fork	12	5-15	74	89
Bitterroot	6	5-15	75	67
MISSOURI RIVER BASIN IN MONTANA				
Marias, Teton & Sun	11	9-15	54	65
Missouri Main Stem	7	15	74	91
Beaverhead-Jefferson	29	5-15	84	77
Madison-Gallatin	10	10-15	70	66
Judith-Musselshell	5	15	78	96
Upper Yellowstone	15	7-15	66	65

AVAILABLE SOIL MOISTURE
as of
March 1, 1960

Drainage Basin and Station	Station No.	Elev.	Soil Profile in Inches		Date	Soil Moisture Content in Inches About 3/1/60				Yrs
			Depth	Cap.		1960	1959	1958	Avg.	
GALLATIN										
College Site	11D2M	4856	54	14.5	2/26	10.7	8.8	5.6	7.2	3
FLATHEAD										
Marias Pass	13A5M	5250	54	8.4	2/29	6.4	6.8	5.5	6.1	6
Spotted Bear R.S.	13B15M	3700	28	5.9	3/1	4.5	5.0	4.6	4.9	3
Trout Lake	13A12M	3600	54	11.8	2/29	11.7	12.6	12.4	12.5	3

AVAILABLE SOIL MOISTURE
as of
October 1, 1959

						1959	1958	1957	Avg.	
GALLATIN										
College Site	11D2M	4856	54	14.5	10/2	8.6	6.8	4.4	5.8	4
FLATHEAD										
Marias Pass	13A5M	5250	54	8.4	10/1	5.6	4.5	3.4	4.5	5
Spotted Bear R.S.	13B15M	3700	28	5.9	9/29	4.3	3.7	1.2	2.7	3
Trout Lake	13A12M	3600	54	11.8	9/29	9.8	10.5	2.1	7.2	3

WATER SUPPLY OUTLOOK

KOOTENAI RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Survey measurements made in the Kootenai River Basin about the first of March indicate that water stored in the snow-pack above Libby is 17 percent less than on March first last year and 80 percent of the 1943-57 average. Water supplies should be adequate during the coming season, with near average to slightly below average streamflow forecast.

The Kootenai River at Libby is forecast to flow 7,532,000 acre feet during the April-September preiod or 98 percent average. Tributary streams to the Kootenai in Montana will flow about 5 to 10 percent less than last year in the Northern portion of the Kootenai drainage. March first snow survey measurements in the Southern portion of the drainage indicate tributary streamflow will be about 20 to 25 percent less than last year.

Report Prepared by

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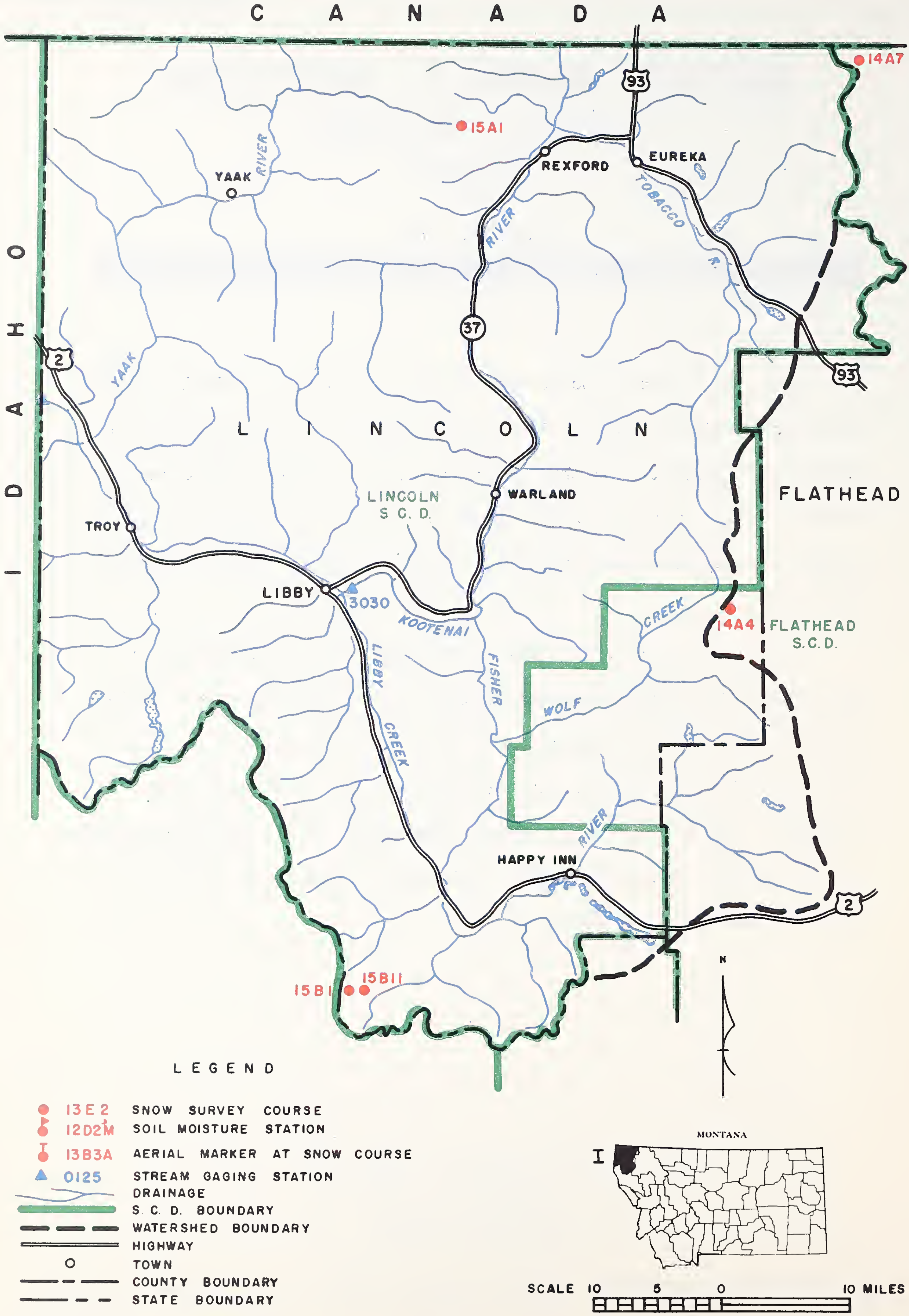
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA-SCS-LINCOLN, NEBR 1960

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED I

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED LAST YEAR	MEASURED + NORMAL
	KOOTENAI RIVER					
3030	Libby (at)	Apr-Sept	7532	98	9820	7722
		Apr-July	6929	104	8088	6694
3050	Leonia (at)	Apr-Sept	8700	98	10969	8907
		Apr-July	8075	103	9162	7818

+ Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED I

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
						LAST YEAR	AVERAGE	
14A4	Brush Creek	5000	2/26	43	10.1	14.0	13.2	9
Can 10	Fernie	3500	2/26	30	6.7	7.9	8.6	15
Can 12A	Field	4200	2/29	27	5.2	7.7	5.5	15
Can 43	Gray Creek	5100	2/28	56	15.6	15.5	17.2	9
Can 33	Kicking Horse	5400	2/29	45	11.9	15.0	13.2	11
Can 20B	Kimberley	3800	2/28	30	7.3	8.0	7.6	15
Can 32	Marble Canyon	5000	2/29	44	9.6	12.6	14.2	11
Can 10A	New Fernie	4100	2/26	45	8.8	13.5	13.4	7
15A1	Red Mountain	6000	2/24	56	15.1	16.8	18.0	15
Can 8A	Sinclair Pass	4500	2/29	30	6.4	4.7	6.1	10
Can 20A	Sullivan Mine	5100	2/26	46	10.2	13.4	13.4	12
Can 41	Upper Elk River	4400	2/28	19	4.5	7.2	8.8	10
14A7	Weasel Divide	5450	2/26	87	27.6	30.8	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

FLATHEAD RIVER BASIN

MONTANA

AS OF:
MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Surveys made near the first of March, 1960 on the Flathead River indicate the 1960 snow-pack is near average for this time of year. The water content of the snow is 93 percent of the 1943-57 average and about 24 percent less than last year. The North Fork of the Flathead River is forecast to flow about 20 percent less than last year; the Middle Fork of the Flathead River, 30 percent less than last year, and the South Fork of the Flathead River to flow 1,827,000 acre feet during April through September, or 57 percent of last year. The Flathead River at Columbia Falls and Polson is expected to flow 87 percent of the 1943-57 average, or 66 percent of last year.

Storage in irrigation and power reservoirs is above average in the Flathead River drainage.

Report Prepared by
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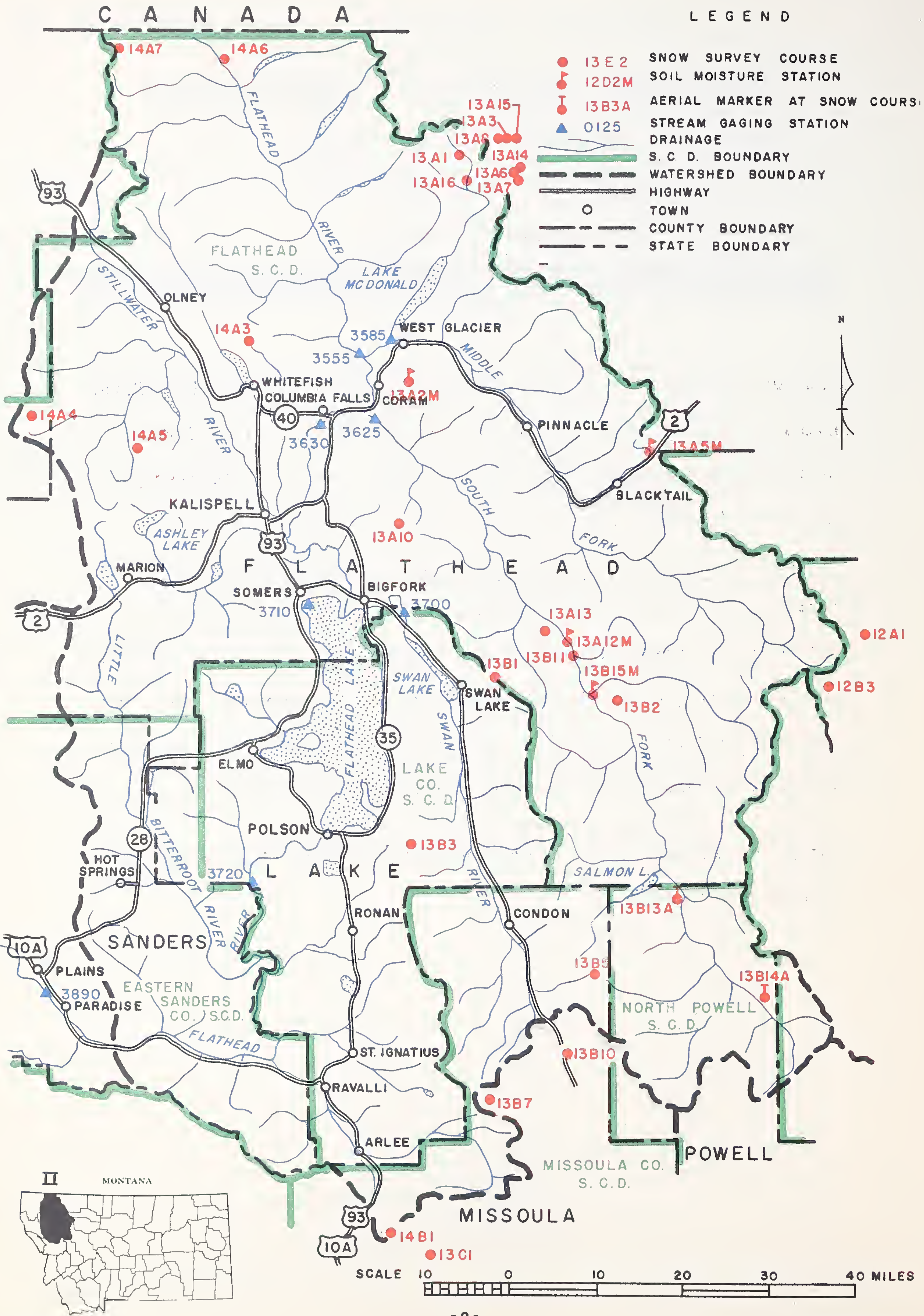
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA SCS-LINCOLN NEBR 1960

5,L-16,398

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED II

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR	+ NORMAL
	NORTH FORK FLATHEAD RIVER					
3555	Columbia Falls (near)	Apr-Sept	1872	96	2378	1942
		Apr-July	1710	97	2103	1769
		Apr-June	1462	98	1766	1491
	MIDDLE FORK FLATHEAD RIVER					
3585	West Glacier (near)	Apr-Sept	1671	89	2361	1881
		Apr-July	1552	89	2156	1747
		Apr-June	1371	92	1796	1480
	SOUTH FORK FLATHEAD RIVER					
3625	Columbia Falls (nr)(17)	Apr-Sept	1827	80	3166	2297
		Apr-July	1761	81	2955	2180
		Apr-June	1731	91	2515	1900
	FLATHEAD RIVER					
3630	Columbia Falls (at)(17)	Apr-Sept	5509	87	7921	6299
		Apr-July	5101	87	7249	5845
		Apr-June	4659	93	6071	4993
3720	Polson (near) (18)	Apr-Sept	6464	87	9801	7462
		Apr-July	6042	87	8906	6939
		Apr-June	5565	94	7464	5897
	SWAN RIVER					
3700	Big Fork (near)	Apr-Sept	557	87	997	641
		Apr-July	509	90	864	568
		Apr-June	470	95	672	460

(17) Observed flow plus change in storage in Hungry Horse Reservoir.
(18) Observed flow plus change in storage in Hungry Horse Res. & Flathead Lake.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF February 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3620	Hungry Horse	3428.0	2962.0	2623.0	2199.3
3710	Flathead	1791.0	1209.0	920.7	768.2
3757	Camas	42.8	35.0	25.9	25.1
3800	Mission Valley	98.6	49.6	28.4	35.5

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN, NEBR. 1960

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED II

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
13B14A	Basin Creek	5000	2/28	24	5.8	9.7	8.8	7
13B3	Big Creek	6750	3/1	110	40.2	52.5	36.6	15
14A4	Brush Creek	5000	2/26	43	10.1	14.0	13.2	9
13A1	Cattle Queen	4700	2/28	80	21.8	32.7	29.9	13
13A2M	Desert Mountain	5600	2/25	54	13.9	16.5	14.2	9
Can 10	Fernie	3500	2/26	30	6.7	7.9	8.6	15
14A3	Hell Roaring Divide	5770	2/23	88	29.3	31.7	27.7	8
13B13A	Holbrook	4530	2/28	29	8.6	12.1	9.5	7
14A6	Kishenehn	3886	3/4	40	10.1	9.6	10.4	13
14A5	Logan Creek	4300	2/26	32	7.2	11.3	8.9	9
13A5M	Marias Pass	5250	2/29	43	12.3	19.2	17.4	15
13A16	Mineral Creek	4500	2/27	57	15.4	23.5	-	-
Can 10A	New Fernie	4100	2/26	45	8.8	13.5	13.4	7
13B7	North Fork Jocko	6330	3/2	94	33.3	48.4	38.3	15
13A13	Quintonkon	3800	3/3	46	13.4	-	14.4	6
13B2	Spotted Bear Mt.	7000	3/1	44	12.5	18.4	15.2	10
13A10	Strawberry Lake	6500	2/29	130	43.1	46.7	35.7	7
13B1	Trinkus Lake	6500	3/1	107	35.1	48.9	35.4	8
13A12M	Trout Lake	3600	2/29	45	13.5	17.6	16.4	10
14B1	TV Mountain	6800	3/3	41	11.4	18.6	-	-
13B11	Twin Creeks	3580	2/29	36	11.1	14.8	11.0	7
13B5	Upper Holland Lake	7000	2/26	84	25.9	41.1	31.0	8
14A7	Weasel Divide	5450	2/26	87	27.6	30.8	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

LOWER CLARK FORK RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Below average snow-pack covers the Lower Clark Fork drainage. Snow surveys made near the first of March indicate the water content of the 1960 snow-pack is 77 percent of the 1943-57 average and 71 percent of last year. Streamflow is forecast to be 5 to 20 percent less than average in the Lower Clark Fork drainage. The April through September flow of the Blackfoot River is expected to be 64 percent of last year. The April-September runoff on the Clark Fork is forecast to flow 80 percent of last year above Missoula and 68 percent of last year at Thompson Falls.

Report Prepared by

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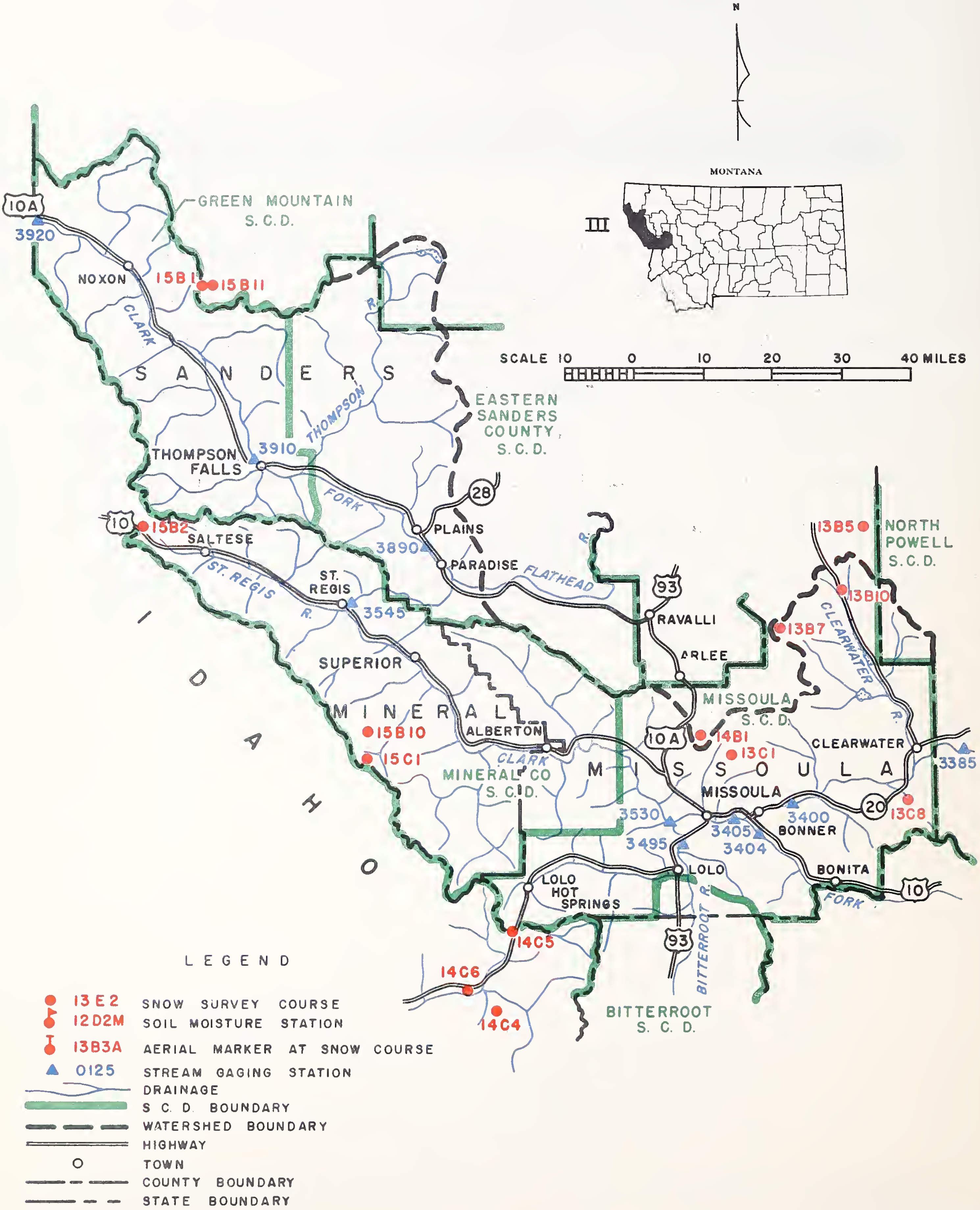
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


N
MONTANA
III
SCALE 10 0 10 20 30 40 MILES
GREEN MOUNTAIN S.C.D.
10A
3920
NOXON
15B1
15B11
CLARK
S A N D E R S
THOMPSON
R.
EASTERN SANDERS COUNTY S.C.D.
THOMPSON FALLS
3910
FORK
28
PLAINS
10
15B2
SALTESE
3890
PARADISE
FLATHEAD
R.
ST. REGIS
R.
ST. REGIS
3545
93
RAVALLI
ARLEE
SUPERIOR
I D A H O
M I N E R A L
15B10
15C1
ALBERTON
CLARK
MINERAL CO S.C.D.
MISSOULA S.C.D.
10A
14B1
13C1
13B5
NORTH POWELL S.C.D.
13B10
13B7
CLEARWATER
R.
CLEARWATER
3385
M I S S O U L A
MISSOULA
20
13C8
3530
3405
3400
BONNER
3495
3404
LOLO
BONITA
10
FORK
LOLO HOT SPRINGS
14C5
93
BITTERROOT R.
14C6
14C4
BITTERROOT S.C.D.
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S.C.D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY

WATER SUPPLY FORECASTS

AS OF
MARCH 1, 1960 - WATERSHED III

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
	BLACKFOOT RIVER					
3400	Bonner (near)	Apr-Sept	856	86	1338	999
		Apr-July	771	85	1214	903
		Apr-June	670	86	1050	775
	CLARK FORK RIVER					
3404	Milltown (above) (14)	Apr-Sept	767	94	696	815
		Apr-July	674	94	610	716
		Apr-June	572	94	516	609
3405	Missoula (above)	Apr-Sept	1623	89	2034	1814
		Apr-July	1445	89	1824	1620
		Apr-June	1242	90	1566	1384
3530	Missoula (below)	Apr-Sept	2723	81	3709	3361
		Apr-July	2457	80	3331	3059
		Apr-June	2122	81	2885	2608
35	St. Regis (at)	Apr-Sept	3633	80	5135	4549
		Apr-July	3294	80	4634	4140
		Apr-June	2838	80	4023	3551
3890	Plains (near) (18)	Apr-Sept	10514	85	15427	12330
		Apr-July	9693	86	13965	11308
		Apr-June	8587	89	11859	9617
3910	Thompson Falls (at)(18)	Apr-Sept	11219	86	16323	13017
		Apr-July	10342	86	14806	11944
		Apr-June	9159	90	12472	10156
3920	Whitehorse Rapids (at)(19)	Apr-Sept	11790	85	11454#	13932
		Apr-July	10839	85	10579#	12763
		Apr-June	9606	89	9712#	10816

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.
(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF
FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3913	Noxon	200.1	198.0E	-	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN NEBR. 1960

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED III

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
13B10	Coyote Hill	4200	2/29	32	9.0	12.4	10.1	11
15C2	Fish Lake Airstrip	5000	2/26	90	28.7	36.2	36.4	5
14C5	Lolo Pass	5230	2/25	71	18.9	28.0	30.5	8
15B2	Lookout	5250	2/29	80	24.3	33.9	33.7	15
13C8	Lubrecht Forest #6	4040	3/1	15	1.7	4.7	4.3	7
13B7	North Fork Jocko	6330	3/2	94	33.3	48.4	38.3	15
14C6	Powell R. S.	4230	2/25	41	9.6	-	-	-
14C4	Savage Pass	6600	2/26	60	18.0	-	-	-
14B1	TV Mountain	6800	3/3	41	11.4	18.6	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960

WATER SUPPLY OUTLOOK

UPPER CLARK FORK RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Surveys made near the first of March indicate that the 1960 snowpack is below average. Water content of the snow over the Upper Clark Fork drainage is 25 percent less than last year and 89 percent of the 1943-57 March first average. Streamflow is forecast to be near average for Flint Creek and Boulder Creek during the April through September period. The Middle Fork of Rock Creek is forecast to flow about 10 percent below average. The Blackfoot River is forecast to flow 86 percent average and 64 percent of last year during the April through September period. The Upper Clark Fork River above the Blackfoot River is estimated to flow 767,000 acre feet during April through September, or 110 percent of last year.

Report Prepared by

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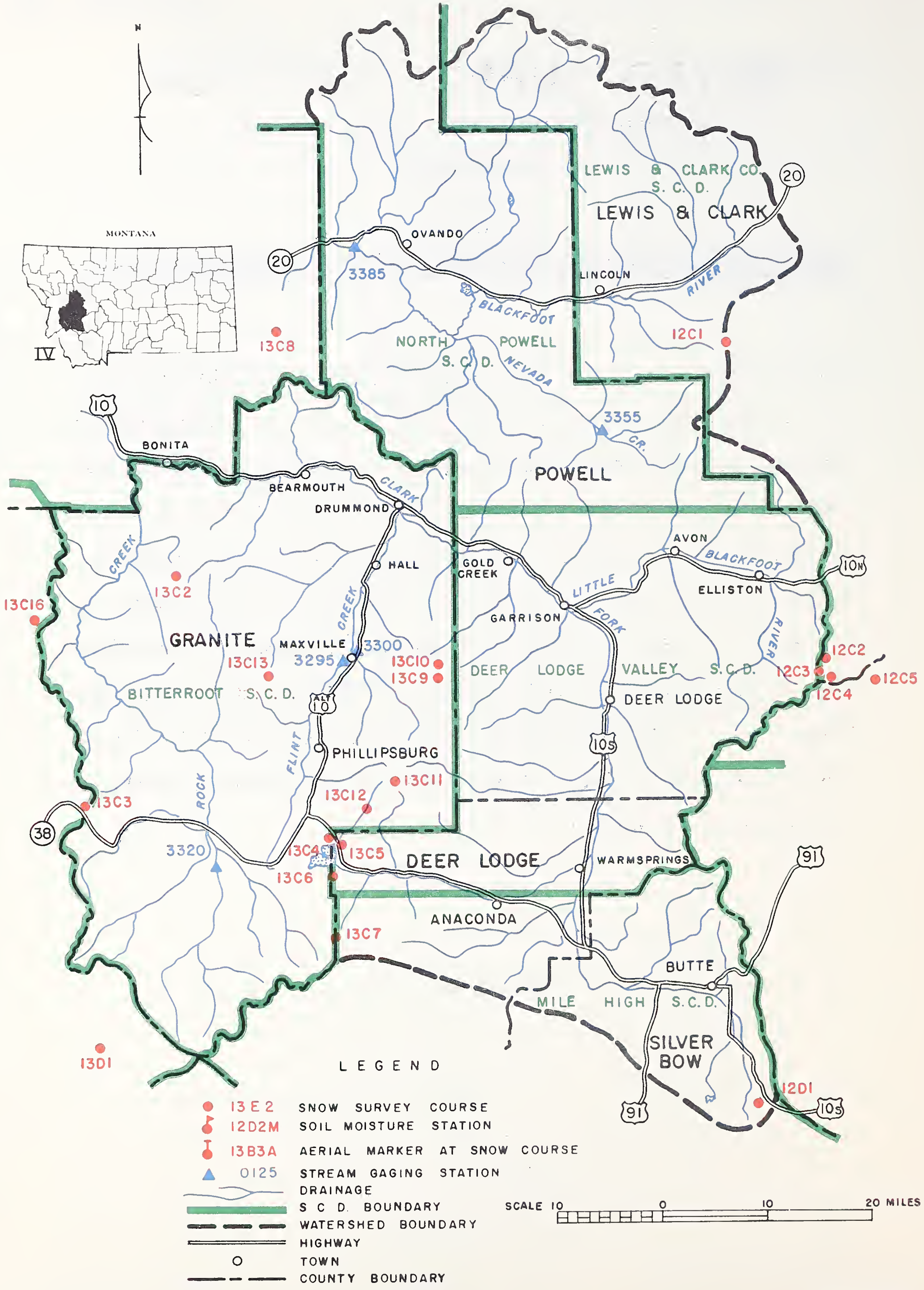
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA SCS LINCOLN NEBR 1960

5,L-16,396

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED IV

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR +	NORMAL
3295	FLINT CREEK Maxville (at)	Apr-Sept	44.5	96	51.5#	46.4
		Apr-July	34.0	96	37.8#	35.4
		Apr-June	26.7	95	27.3#	28.0
3300	BOULDER CREEK Maxville (at)	Apr-Sept	27.2	97	26.8#	28.2
		Apr-July	24.9	97	24.6#	25.8
		Apr-June	21.6	101	20.9#	21.4
3320	MIDDLE FORK ROCK CREEK Philipsburg (near)	Apr-Sept	71.1	87	72.1#	82.2
		Apr-July	66.6	92	65.0#	72.1
		Apr-June	55.5	93	55.5#	59.4
3404	CLARK FORK RIVER Milltown (above) (14)	Apr-Sept	767	94	696	815
		Apr-July	674	94	610	716
		Apr-June	572	94	516	609

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.

(+) Provisional data furnished by U. S. Geological Survey.

(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3250	Georgetown Lake	31.0	28.2	26.1	23.0
3365	Nevada Creek	12.6	7.3	-	7.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED IV

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
13C16	Ambrose	6475	2/23	36	8.6	-	-	-
13C13	Black Pine	7100	2/24	35	8.2	-	-	-
12C5	Chessman Reservoir	6200	2/29	18	4.1	5.6	4.3	15
13C9	El Dorado Mine	7800	2/26	58	16.1	20.5	16.3	5
13C11	Fred Burr Pass	8000	2/23	60	17.4	25.3	-	-
13C10	Gold Creek Lake	7200	2/26	40	9.6	15.3	13.3	5
13C4	Intergaard	6450	3/1	20	5.0	7.6	6.6	15
13C8	Lubrecht Forest #6	4040	3/1	15	1.7	4.7	4.3	7
12D1	Pipestone Pass	7200	3/4	24	5.5	5.0	4.4	15
13C12	Red Lion	7000	2/23	42	9.6	15.2	-	-
13C3	Skalkaho Summit	7259	2/24	53	14.7	-	-	-
13C2	Slide Rock Mountain	7100	2/25	41	9.8	12.4	-	-
13C5	Southern Cross	6500	3/1	19	4.5	6.1	5.0	15
12C1	Stemple Pass	6900	2/26	33	7.2	13.6	9.2	15
13C7	Storm Lake	7780	2/23	37	9.2	12.4	11.2	5
13C6	Stuart Mill	6500	3/1	22	4.6	6.2	5.6	15
12C2	Ten Mile, Lower	6250	2/28	28	6.0	7.6	6.3	15
13C3	Ten Mile, Middle	6800	2/27	37	8.5	9.6	9.2	15
12C4	Ten Mile, Upper	8000	2/27	43	11.0	13.7	11.9	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960

5,L-16,395.2

WATER SUPPLY OUTLOOK

BITTERROOT RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Water stored in the snow-pack is below average in the Bitterroot River drainage. Snow Surveys made near the first of March indicate that water content in the snow is only 67 percent of the 1943-57 average and 75 percent of last year. Unless precipitation is much above normal in the coming months, there will be a short supply of water for irrigation.

The Bitterroot River near Darby is forecast to flow 446,000 acre feet during the April-September period, or 76 percent average. Smaller tributaries to the Bitterroot are forecast to flow 70 to 80 percent average with the exception of Blodgett Creek, where 94 percent average is forecast for the April-September period.

Report Prepared by

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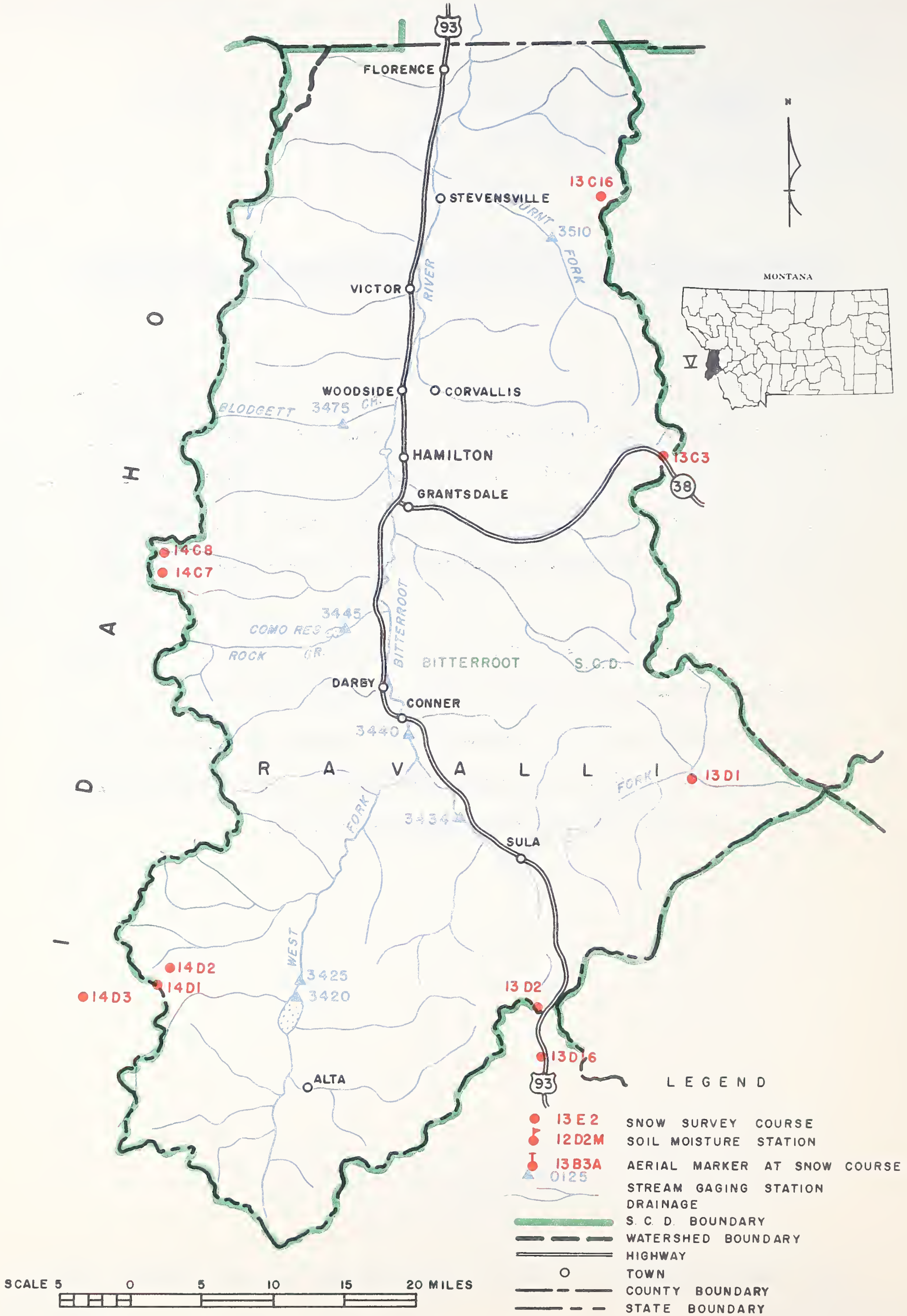
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA-SCS-LINCOLN NEBR. 1960

5,L-16,518.2

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED V

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED LAST YEAR +	MEASURED NORMAL
3425	WEST FORK BITTERROOT RIVER Conner (near) (15)	Apr-Sept	128	72	193	176
		Apr-July	116	71	181	164
		Apr-June	102	69	166	147
3440	BITTERROOT RIVER Darby (near)	Apr-Sept	446	76	593	587
		Apr-July	408	75	545	547
		Apr-June	353	74	480	477
3475	BLODGETT CREEK Corvallis (near)	Apr-Sept	44.0	94	46.5	46.7
		Apr-July	40.3	92	43.6	44.4
		Apr-June	34.6	91	37.1	37.9
3510	BURNT FORK CREEK Stevensville (near)	Apr-Sept	24.9	80	25.5	31.2
		Apr-July	21.7	78	22.2	28.0
		Apr-June	18.0	78	18.8	23.1

+ Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN, NEBR. 1960

SNOW SURVEY DATA
AS OF MARCH 1, 1960

WATERSHED V

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
13C16	Ambrose	6475	2/23	36	8.6	-	-	-
13D1	East Fork R. S.	5400	2/26	26	5.3	7.1	5.6	5
13D2	Gibbons Pass	7100	2/29	50	14.9	19.7	22.2	15
14C5	Lolo Pass	5230	2/25	71	18.9	28.0	30.5	8
14C7	Lost Horse	5940	2/24	73	19.3	-	-	-
13D16	Moose Creek	6200	2/26	44	10.8	14.4	16.1	15
14D2	Nez Perce Camp	5580	2/25	42	9.1	8.7	12.6	12
14D1	Nez Perce Pass	6575	2/25	46	10.2	13.7	16.7	13
14C6	Powell R. S.	4230	2/25	41	9.6	-	-	-
14C4	Savage Pass	6600	2/26	60	18.0	-	-	-
13C3	Skalkaho Summit	7259	2/24	53	14.7	-	-	-
14C8	Twin Lakes	6510	2/24	93	24.7	-	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR. 1960

5,L-16,395.2

WATER SUPPLY OUTLOOK

MARIAS, TETON, & SUN RIVER BASINS

MONTANA

AS OF:
MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Below average snow-pack exists in the Marias, Teton and Sun River drainage. Snow Surveys made near the first of March indicate the water content of the 1960 snow-pack is 65 percent of the 1943-57 average and 54 percent of last year.

Above normal precipitation last October and November, and high streamflow during the fall and winter months indicate the runoff in the spring and summer months of 1960 will be larger than normally expected from this below average snow-pack. The April through September inflow to Gibson Reservoir is forecast to be 28 percent less than last year and 94 percent of the 1943-57 average. The Marias River is forecast to flow slightly above the 1943-57 average.

Reservoir storage is above average and about the same as last year, with the exception of Willow Creek Reservoir, which is below the average stage.

Report Prepared by

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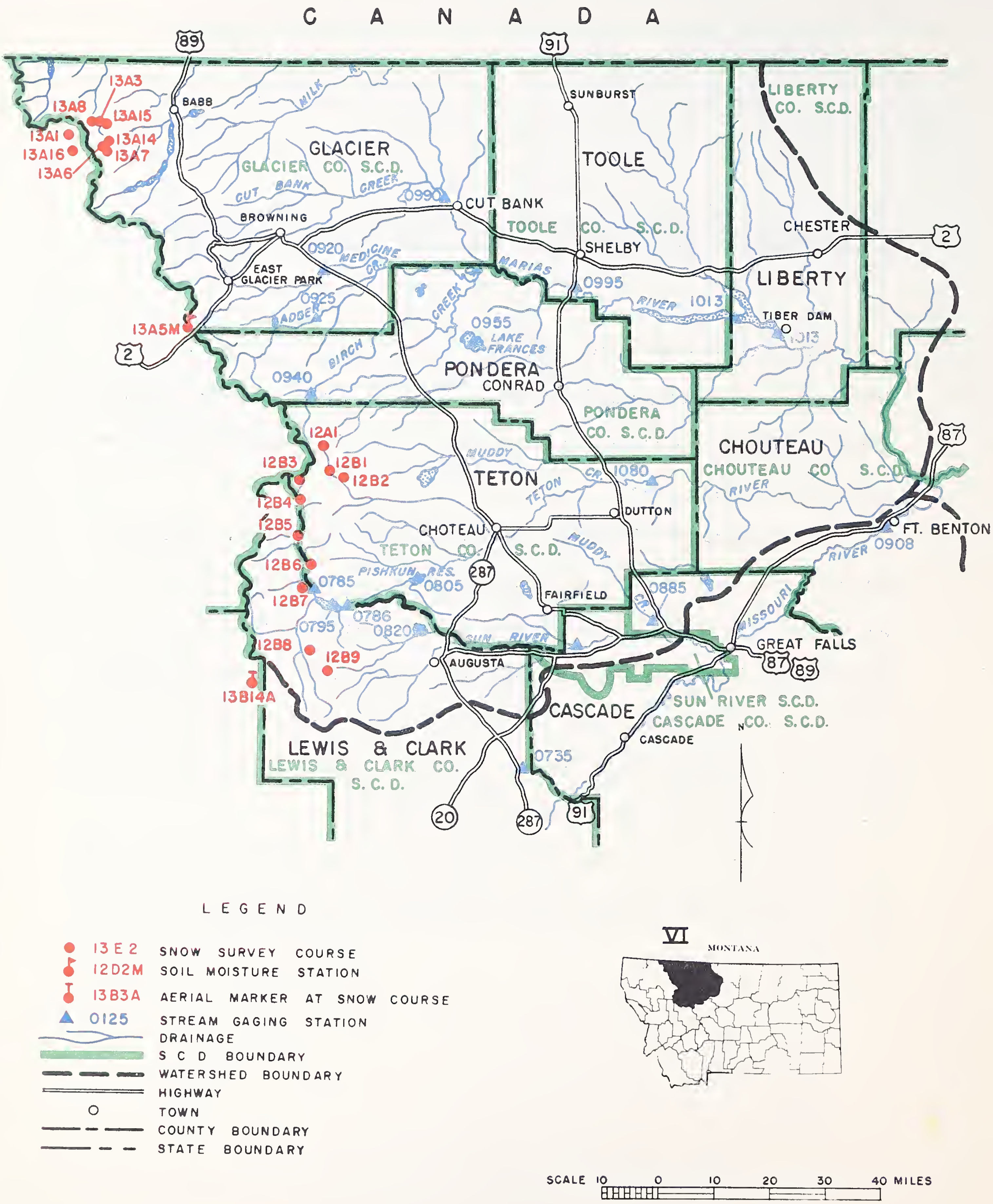
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


C A N A D A
GLACIER
GLACIER CO. S.C.D.
TOOLE
TOOLE CO. S.C.D.
LIBERTY
LIBERTY CO. S.C.D.
PONDERA
PONDERA CO. S.C.D.
TETON
TETON CO. S.C.D.
CHOUTEAU
CHOUTEAU CO. S.C.D.
CASCADE
CASCADE CO. S.C.D.
SUN RIVER S.C.D.
LEWIS & CLARK
LEWIS & CLARK CO. S.C.D.
BABB
BROWNING
EAST GLACIER PARK
CUT BANK
SUNBURST
SHELBY
CHESTER
TIBER DAM
CONRAD
DUTTON
CHOTEAU
FAIRFIELD
AUGUSTA
GREAT FALLS
CASCADE
FT. BENTON
MILK R.
CUT BANK CREEK
MEDICINE CR.
BADGER
BIRCH
CREEK
MARIAS RIVER
LAKE FRANCES
MUDDY
TETON CR.
MUDDY
PISHKUN RES.
SUN RIVER
CR.
MISSOURI
RIVER
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13A8
13A15
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12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
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WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED VI

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED + LAST YEAR	MEASURED + NORMAL
	N. FORK OF N. FORK SUN					
0785	Augusta (near)	Apr-Sept	214	88	193#	239
		Apr-July	199	88	176#	222
	SUN RIVER					
0786	Gibson Dam (at)	Apr-Sept	541	94	749	574
		Apr-July	497	94	689	526
	MARIAS RIVER					
0995	Shelby (near)	Apr-Sept	696	106	464#	659
		Apr-July	648	107	424#	605

(#) 1958 data; 1959 data not available.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL
1013	Tiber	1316.0	636.1	637.2	-
0955	Lake Francis	112.0	96.3	96.8	94.6
0805	Pishkun	32.0	21.6	19.7	18.8
0795	Gibson	105.0	70.8	76.1	63.3
0820	Willow Creek	32.3	14.4	29.3	19.2
0940	Swift	30.0	27.0	28.5	23.1

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA
AS OF

MARCH 1, 1960

WATERSHED VI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches) LAST YEAR	AVERAGE	YEARS OF RECORD
12B8	Benchmark	5500	3/2	19	5.2	10.1	9.0	9
12B6	Cabin Creek	5400	2/28	23	5.6	11.8	6.8	9
12B9	Five-Bull	5600	3/2	17	4.2	8.6	7.0	9
12A1	Freight Creek	6000	2/29	39	10.0	18.8	15.6	10
12B5	Gates Park	5300	2/28	25	6.2	14.9	10.1	9
12B7	Goat Mountain	7000	2/28	28	8.0	12.4	10.7	15
13A5M	Marias Pass	5250	2/29	43	12.3	19.2	17.4	15
12B2	Waldron Creek	5600	2/29	14	3.7	8.0	6.9	10
12B1	West Fork	6000	2/29	32	9.0	15.5	14.9	10
12B4	Wrong Creek	5700	2/28	37	9.5	19.0	15.1	9
12B3	Wrong Ridge	6800	2/28	49	14.0	24.6	21.2	9

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960

5,L-16,395.2

WATER SUPPLY OUTLOOK

MISSOURI RIVER (MAIN STEM) BASIN

MONTANA

AS OF:
MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Near average snow-pack was measured near the first of March on the smaller tributaries of the Missouri River between Toston and Fort Benton. Water content of the snow at seven (7) snow courses along the Missouri Main Stem is 91 percent of the 1943-57 average and 74 percent of last year.

Streamflow in the Smith River drainage should be near average during the spring and summer months. The Missouri River is forecast to flow about 90 percent of the 1943-57 average.

Reservoir storage is near average, with the exception of Canyon Ferry which is above average.

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960

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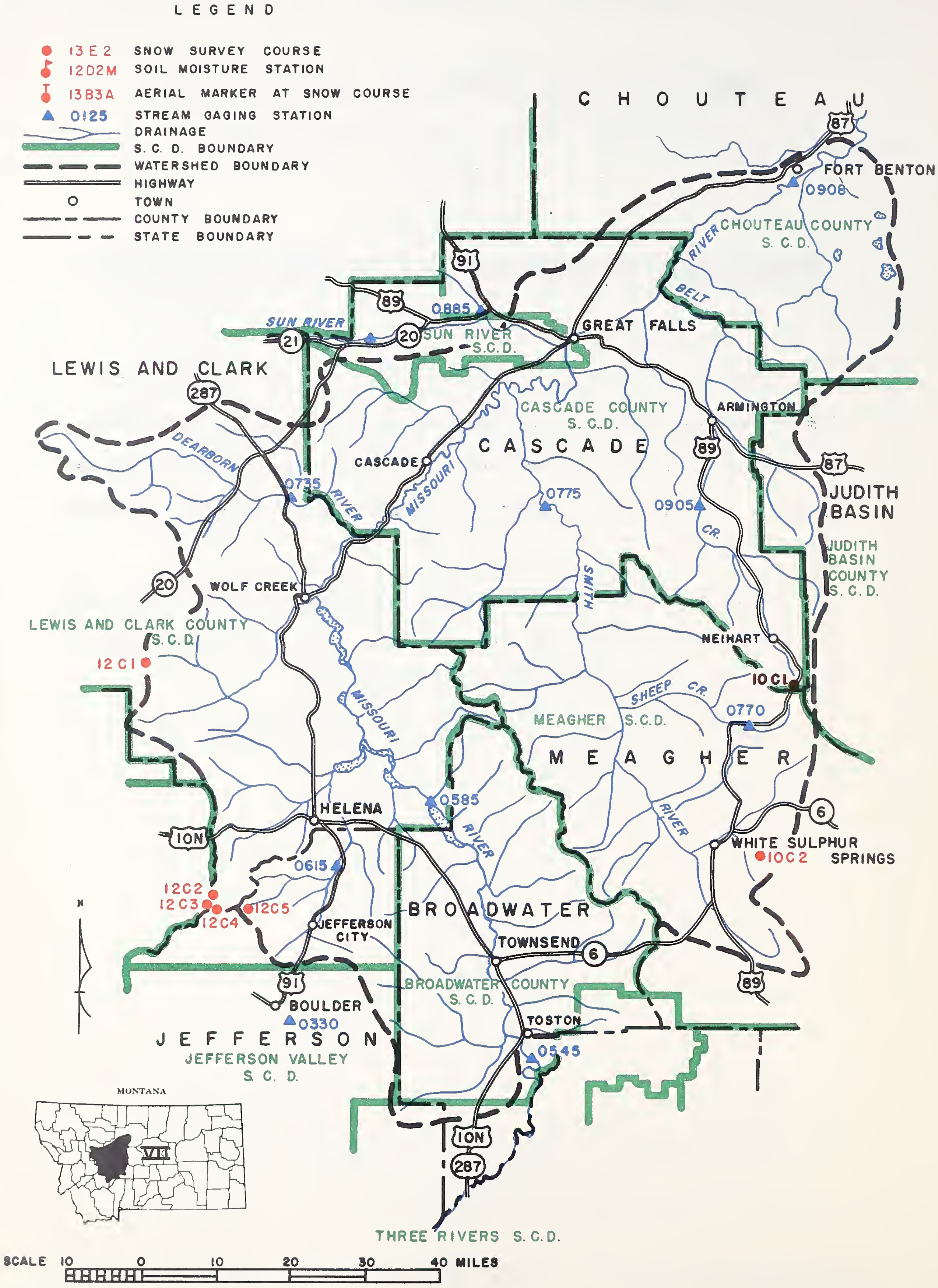

USDA-SCS-LINCOLN, NEBR 1960

5,L-16,400.2

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED VII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
	MISSOURI RIVER					
0545	Toston (at) (3)	Apr-Sept	2137	91	1971#	2342
		Apr-July	1869	92	1725#	2030
0908	Fort Benton (at) (5)	Apr-Sept	3295	92	2920#	3599
		Apr-July	2836	92	2512#	3076
1095	Virgelle (at) (6)	Apr-Sept	4002	91	3599#	4393
		Apr-July	3492	92	3120#	3803
1150	Zortman (near) (6)	Apr-Sept	4384	91	3896#	4806
		Apr-July	3809	92	3349#	4143
1320	Ft. Peck Dam (below)(7)	Apr-Sept	4304	90	3531#	4761
		Apr-July	3813	91	3150#	4181
1770	Wolf Point (near) (7)	Apr-Sept	4736	90	3707#	5261
		Apr-July	4218	91	3299#	4652
3300	Williston, N. D. (8)	Apr-Sept	10178	81	10729	12562
		Apr-July	9001	81	10136	11101
	PRICKLY PEAR CREEK					
0615	Clancy (near)	Apr-Sept	28.5	119	24.3#	23.9
		Apr-July	24.8	118	22.0#	20.8

(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(5) Observed flow plus change in storage in Canyon Ferry.
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(7) Observed flow plus change in storage in Canyon Ferry, Tiber & Ft. Peck Reservoir
(8) Observed flow plus change in storage in Ft. Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0585	Canyon Ferry	2043.0	1847.0	1687.0	1332.0
0645	Lake Helena	10.4	4.5	9.4	8.3
0660	Holter Lake	81.9	16.0	45.2	59.2
0650	Hauser Lake & Lake Helena	61.9	43.6	59.0	54.1
1315	Fort Peck	19410.0	10010.0	8848.0	11178.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MARCH 1, 1960 WATERSHED VII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	
12C5	Chessman Reservoir	6200	2/29	18	4.1	5.6	4.3	15
10C2	Grasshopper	7000	3/1	20	4.1	5.0	4.3	15
10C1	Kings Hill	7950	2/27	43	10.6	14.4	11.5	15
12C1	Stemple Pass	6900	2/26	33	7.2	13.6	9.2	15
12C2	Ten Mile, Lower	6250	2/28	28	6.0	7.6	6.3	15
12C3	Ten Mile, Middle	6800	2/27	37	8.5	9.6	9.2	15
12C4	Ten Mile, Upper	8000	2/27	43	11.0	13.7	11.9	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960

5,L-16,395.2

WATER SUPPLY OUTLOOK

BEAVERHEAD, & JEFFERSON RIVER BASINS

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Below average snow-pack exists on the Beaverhead and Jefferson River drainages. Snow Surveys made near the first of March indicate the water content of the 1960 snow-pack is 77 percent of the 1943-57 average and 84 percent of March last year.

Above normal precipitation last fall and high streamflow during the fall and winter months indicate the spring and summer runoff will be higher than normally expected from a below average snow-pack. The Big Hole River is forecast to flow near average. The Beaverhead River is expected to flow almost twice the volume of last year. The Red Rock River at Monida is forecast to flow 70,400 acre feet during April through September. This flow is 82 percent average and 30 percent more than last year. Streamflow for the Boulder River is expected to be 10 percent above average during the spring and summer months. The Jefferson River at Sappington is expected to flow an average volume from April through September.

Report Prepared by

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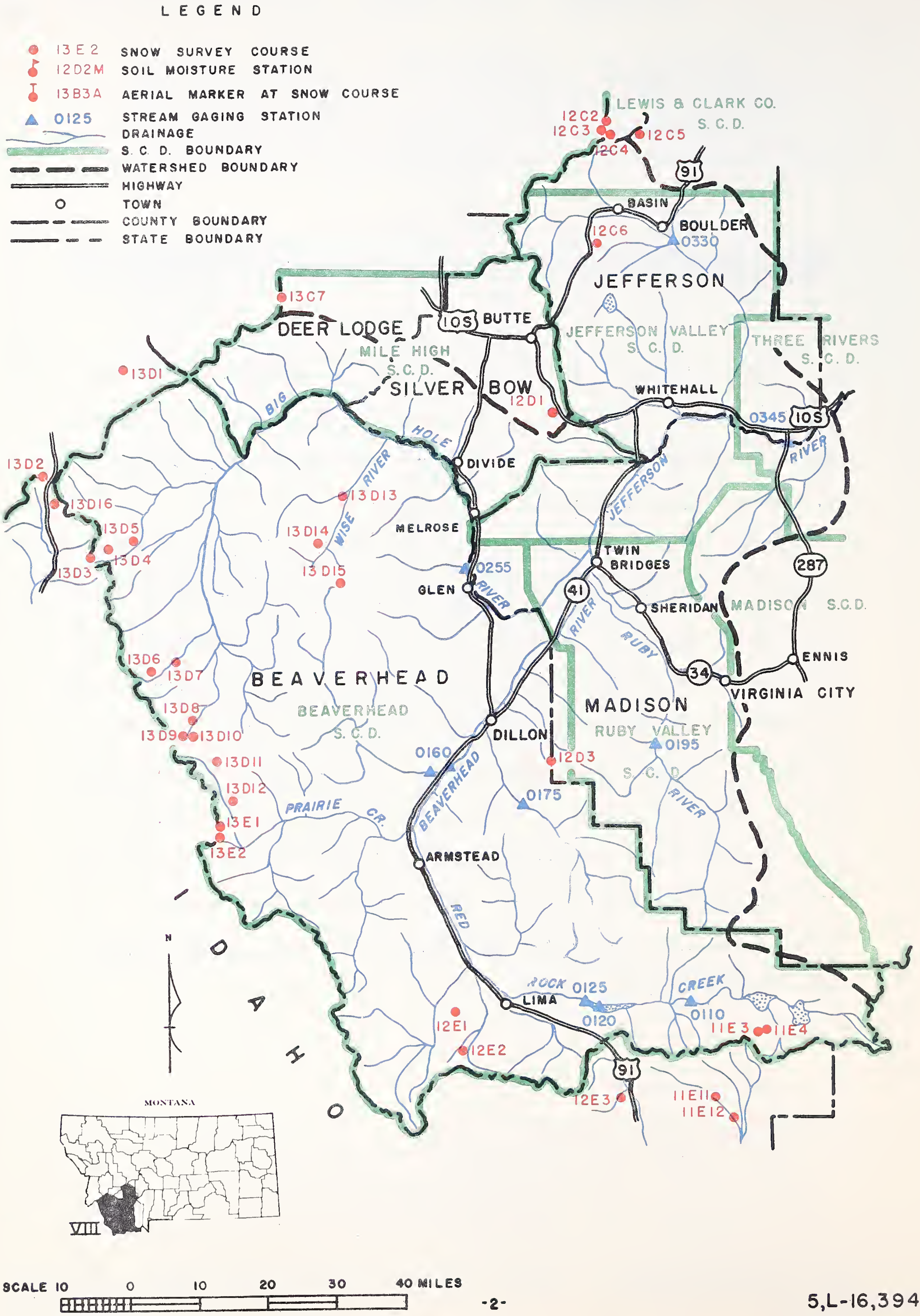
USDA SCS LINCOLN NEBR 1960



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USDA-SCS-LINCOLN, NEBR. 1960

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED VIII

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED LAST YEAR +	MEASURED NORMAL
	RED ROCK RIVER					
0110	Kennedy Ranch (at)	May-Sept	38.0	69	34.1	54.9
		May-July	33.2	68	28.8	49.1
0125	Monida (near) (1)	Apr-Sept	70.4	82	53.6	86.4
		Apr-July	66.4	81	49.1	82.2
	BEAVERHEAD RIVER					
0160	Barratts (at) (1)	Apr-Sept	163	94	90	173
		Apr-July	126	81	68	155
	BIG HOLE RIVER					
0255	Melrose (near)	Apr-Sept	752	98	644	770
		Apr-July	703	98	592	714
	BOULDER RIVER					
0330	Boulder (near)	Apr-Sept	89.0	111	67.5	79.9
		Apr-July	85.0	112	64.8	76.5
	JEFFERSON RIVER					
0345	Sappington (at)	Apr-Sept	1053	98	835	1074
		Apr-July	9457	99	750	958

(1) Observed flow plus change in storage in Lima Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED VIII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches) LAST YEAR	WATER CONTENT (Inches) AVERAGE	
13D14	Anderson Meadow	7000	2/24	20	3.9	6.5	7.4	10
13D4	Below Big Hole Pass	6900	2/25	37	8.9	13.0	13.0	10
13D3	Big Hole Pass	7240	2/25	38	8.7	15.4	15.1	10
13D10	Bloody Dick	7600	2/26	33	7.5	9.3	10.3	10
12E3	Camp Creek	6800	2/29	26	7.0	8.1	9.2	15
12C5	Chessman Reservoir	6200	2/29	18	4.1	5.6	4.3	15
13D5	East Boundary	6700	2/25	22	4.7	7.4	7.1	10
13D15	Elk Horn	8450	3/1	28	5.7	8.8	9.1	15
12D3	Flashlight	6950	3/3	26	5.5	-	3.9	13
13D2	Gibbons Pass	7100	2/29	50	14.9	19.7	22.2	15
13D9	Gold Stone	8100	2/26	38	9.0	13.0	13.1	10
13D8	Jahnke Creek	7340	2/26	31	7.1	8.9	9.7	10
11E12	Kilgore	6200	2/29	28	7.4	8.6	9.4	15
11E4	Lakeview Canyon	6930	3/1	31	7.3	8.6	10.2	10
11E3	Lakeview Ridge	7400	3/1	28	6.6	7.8	8.5	10
13E1	Lemhi Pass	7450	2/29	30	6.6	7.8	7.4	10
12E2	Limekiln	6950	3/2	11	1.8	0	1.2	10
13D6	Miner Forks	7300	2/27	34	8.4	10.0	10.7	10
13D7	Miner Lake	6720	2/27	30	5.7	7.0	7.0	13
13D16	Moose Creek	6200	2/26	44	10.8	14.4	16.1	15
12C6	Picnic Grounds	6500	3/1	15	2.5	3.6	4.7	11
12D1	Pipestone Pass	7200	3/4	24	5.5	5.0	4.4	15
13D11	Selway Junction	6800	3/1	25	5.4	5.3	7.2	10
13C7	Storm Lake	7780	2/23	37	9.2	12.4	11.2	5
12C2	Tenmile, Lower	6250	2/28	28	6.0	7.6	6.3	15
12C3	Tenmile, Middle	6800	2/27	37	8.5	9.6	9.2	15
12C4	Tenmile, Upper	8000	2/27	43	11.0	13.7	11.9	15
13D12	Terrell Creek	6650	3/1	14	2.6	3.4	4.3	10
13E2	Trail Creek	7090	2/29	30	6.6	6.9	6.7	10
12E1	White Pine Ridge	8850	3/2	20	4.0	3.0	4.4	10
13D13	Wise River	6300	2/24	15	3.6	6.0	4.9	10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

MADISON, & GALLATIN RIVER BASINS
MONTANA

AS OF:
MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Below average snow-pack exists throughout the headwaters of the Madison and Gallatin River drainages. The most acute shortage is in the Madison drainage where snow surveys made about the first of March indicate the water stored in the snow is about one-half average. Above average snow-pack exists in the headwaters of Hyalite Creek where the water content at Devil's Slide snow course is 116 percent of the 1943-57 average and 95 percent of last year.

The Madison River near West Yellowstone is forecast to flow 77 percent of the 1943-57 average and 85 percent of last year. Near average flows are forecast for the West Gallatin River and Hyalite Creek. The East Gallatin River is forecast to flow about 20 percent less than last year.

Soil moisture units installed on the Montana State College campus in 1956 indicate about 2 inches more available soil moisture than was recorded at this time last year, and 5 inches more than in 1958.

Storage in Middle Creek Reservoir is 117 percent average, the same as last year. Hebgen Lake has been lowered for inspection and repair of earthquake damage to Hebgen Dam.

Report Prepared by
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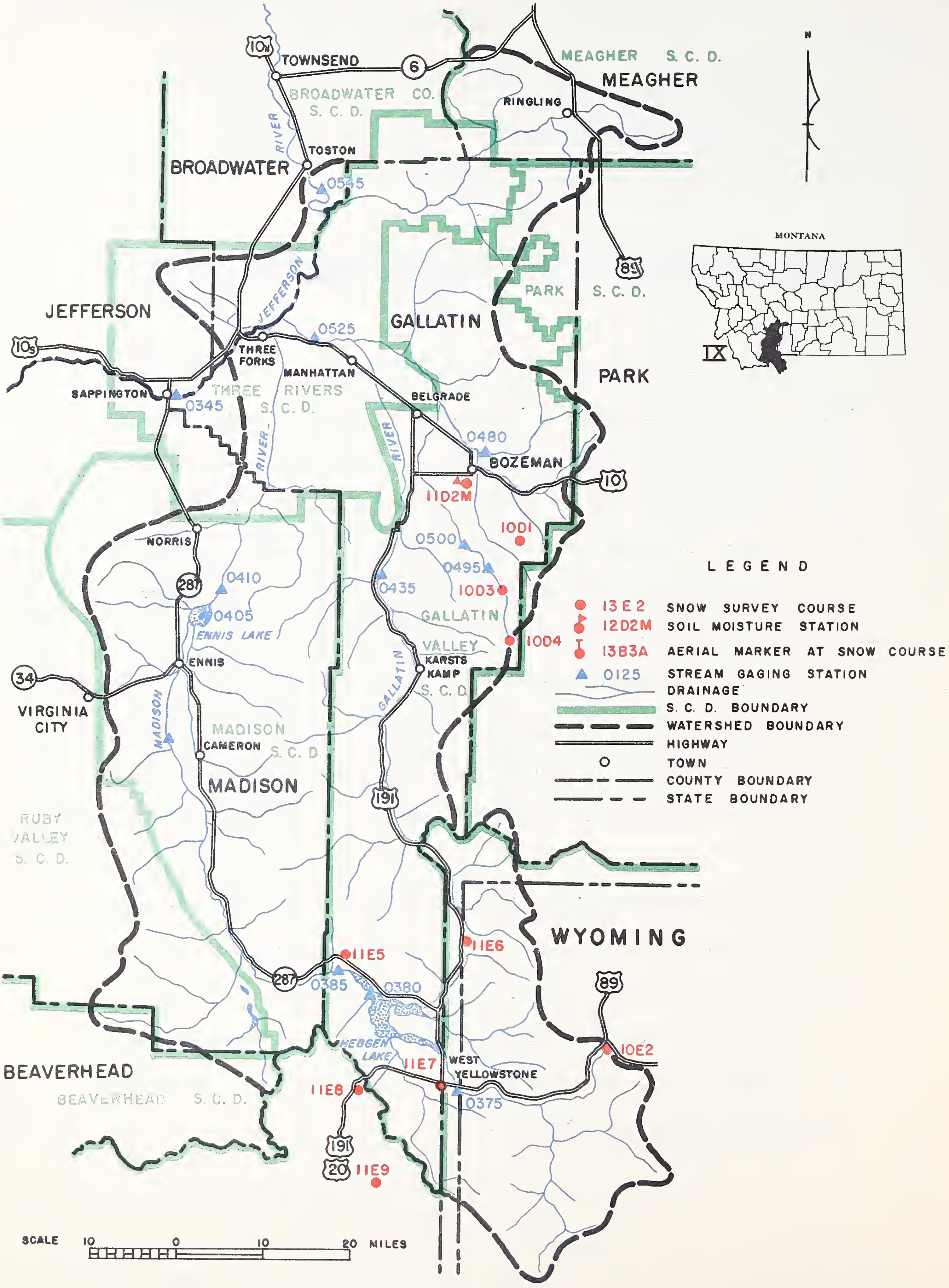
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA-SCS-LINCOLN, NEBR. 1960

WATER SUPPLY FORECASTS
AS OF MARCH 1, 1960 - WATERSHED IX

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	MADISON RIVER					
0375	West Yellowstone (nr)	Apr-Sept	167	77	192	216
		Apr-July	123	75	137	165
0385	Grayling (nr) (2)	Apr-Sept	346	77	366	448
		Apr-July	266	74	271	357
0410	McAllister (nr) (3)	Apr-Sept	607	80	679	756
		Apr-July	479	78	526	613
	WEST GALLATIN RIVER					
0435	Gateway (nr)	Apr-Sept	440	96	506	459
		Apr-July	379	96	418	395
0500	Hyalite Cr. R.S.(at)(4)	Apr-Sept	33.9	94	31.8#	36.1
		Apr-July	28.7	92	27.4#	31.0
	EAST GALLATIN RIVER					
0480	Bozeman (at)	Apr-Sept	40.4	88	50.6	46.4
		Apr-July	36.1	88	44.3	40.7
	GALLATIN RIVER					
0525	Logan (at)	Apr-Sept	467	95	359#	492
		Apr-July	400	95	295#	422

(2) Observed flow plus change in storage in Hebgen Lake.
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(4) Observed flow plus change in storage in Hyalite Reservoir.
(+) Provisional data furnished by U. S. Geological Survey
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA
AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL
0380	Hebgen Lake	345.0	25.8	168.2	213.9
0405	Ennis Lake	41.0	37.7	38.9	35.9
0500	Middle Creek	8.0	4.2	4.2	3.6

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN, NEBR 1960

SNOW SURVEY DATA

AS OF MARCH 1, 1960

WATERSHED IX

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
11E9	Big Springs	6500	2/28	38	10.0	16.3	20.2	15
10D4	Devil's Slide	8100	2/28	65	19.0	19.9	16.3	15
11E5	Hebgen	6550	2/24	34	7.9	10.5	11.2	15
10D3	Hood Meadow	6600	2/27	32	7.1	8.2	7.2	15
11E10	Island Park	6315	2/28	36	7.9	13.1	15.8	15
10D1	New World	6700	3/1	35	8.8	10.6	8.7	14
10E2	Norris Basin	7500	3/1	30	4.0	9.1	9.4	10
11E6	Twenty-One Mile	7150	2/24	37	8.8	14.3	16.0	15
11E8	Valley View	6500	2/28	30	6.9	11.6	13.8	12
11E7	West Yellowstone	6700	2/24	23	5.2	8.2	11.3	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

JUDITH, & MUSSELSHELL RIVER BASINS

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Near average snow-pack covers the Judith and Musselshell River drainages. Snow Surveys made near the first of March indicate the water content of the 1960 snow-pack is 78 percent of last year and 96 percent of the 1943-57 average.

Streamflow is forecast to be near average during the spring and summer months on both the Judith and Musselshell River drainages.

Reservoir storage is below average and also less than last year.

Report Prepared by

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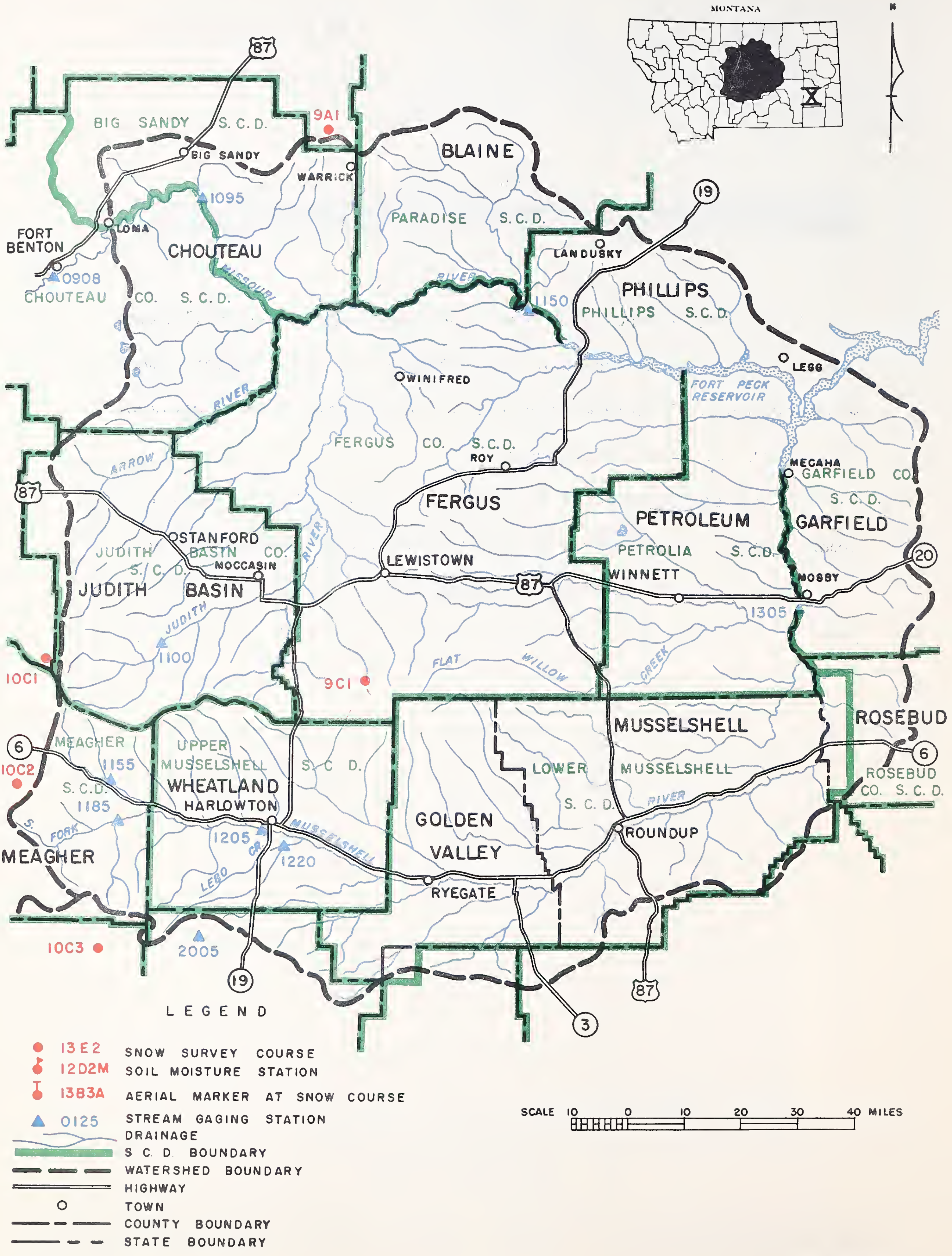
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


MONTANA
N
87
BIG SANDY S. C. D.
9A1
BIG SANDY
WARRICK
BLAINE
1095
LOMA
FORT BENTON
CHOUTEAU
0908
CHOUTEAU CO. S. C. D.
MISSOURI
RIVER
PARADISE S. C. D.
19
LANDUSKY
PHILLIPS
PHILLIPS S. C. D.
1150
WINIFRED
LEGG
FORT PECK RESERVOIR
RIVER
ARROW
FERGUS CO. S. C. D.
ROY
MECAHA
GARFIELD CO. S. C. D.
87
FERGUS
PETROLEUM
GARFIELD
STANFORD
JUDITH BASIN CO. S. C. D.
MOCCASIN
RIVER
LEWISTOWN
PETROLIA S. C. D.
20
MOSBY
WINNETT
87
JUDITH BASIN
JUDITH
1305
1100
10C1
FLAT WILLOW CREEK
9C1
MUSSELSHELL
ROSEBUD
6
MEAGHER
1155
10C2
UPPER MUSSELSHELL S. C. D.
WHEATLAND
HARLOWTON
LOWER MUSSELSHELL S. C. D.
RIVER
6
ROSEBUD CO. S. C. D.
S. C. D.
1185
S. FORK
GOLDEN VALLEY
ROUNDUP
MEAGHER
1205
CR.
1220
MUSSELSHELL
LEBO
RYEGATE
10C3
2005
19
87
3
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 WATERSHED X

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED LAST YEAR+	MEASURED NORMAL
	MUSSELSHELL RIVER					
	South Fork					
1185	Martinsdale (above)	Apr-Sept	56.4	105	25.6#	53.6
		Apr-July	54.0	105	24.2#	51.4
1205	Harlowton (at) (9)	Apr-Sept	87	105	34.5#	83.0
		Apr-July	86	105	33.9#	82.0
	MISSOURI RIVER					
1095	Virgelle (at) (6)	Apr-Sept	4002	91	3599#	4393
		Apr-July	3492	92	3120#	3803
1150	Zortman (near) (6)	Apr-Sept	4384	91	3896#	4806
		Apr-July	3809	92	3349#	4143

(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL
1190	Martinsdale	23.1	6.3	7.0	9.8
1165	Durand	7.0	4.6	5.0	4.9
1105	Ackley	5.8	4.1	-	4.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MARCH 1, 1960 WATERSHED X

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches) LAST YEAR	WATER CONTENT (Inches) AVERAGE	YEARS OF RECORD
9C1	Crystal Lake	6100	2/18	48	11.4	15.2	9.9	15
10C2	Grasshopper	7000	3/1	20	4.1	5.0	4.3	15
10C1	Kings Hill	7950	2/27	43	10.6	14.4	11.5	15
10C3	Porcupine	6500	2/29	23	4.8	5.3	5.7	15
9A1	Rocky Boy	5200	3/1	16	3.8	4.7	4.8	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

UPPER YELLOWSTONE RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The March first 1960 snow-pack over the Upper Yellowstone Basin is 66 percent of last year, or 65 percent average. Within Yellowstone Park many of the snow survey courses measured are close to 50 percent average. At Norris Basin the March first snow depth is 30 inches with 4 inches of water content, or 42 percent average, the lowest in 20 years of record.

Above average precipitation during the fall and early winter months, together with an above average base flow of the rivers, has brought the streamflow forecast of the Clark Fork River at Chance up to 80 percent of average during the April-July period. The Yellowstone River at Corwin Springs should produce 1,172,000 acre feet of water or 71 percent of average for this same period.

Small uncontrolled tributary streams in this area should follow this below-average flow pattern.

Report Prepared by

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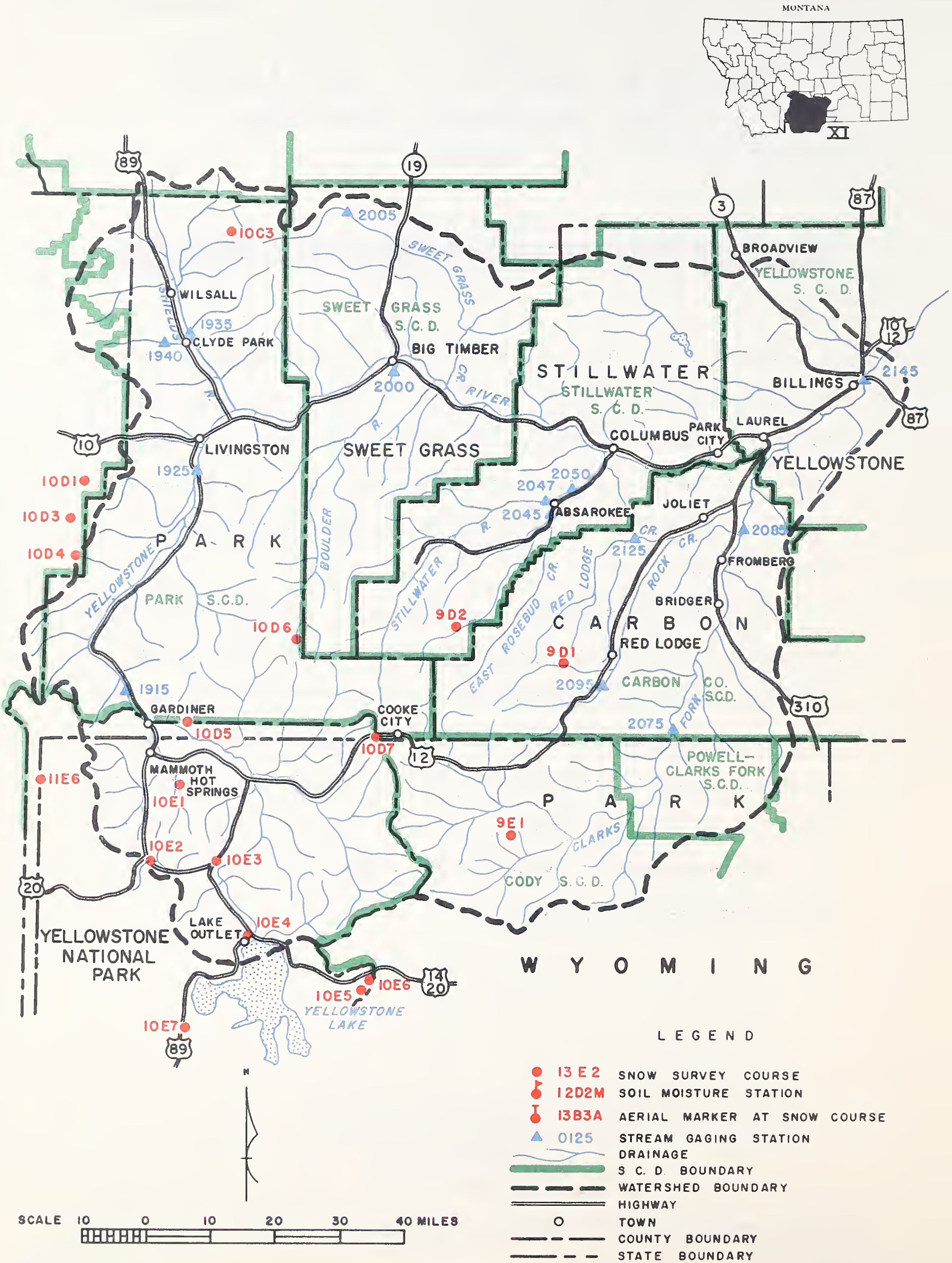
USDA SCS LINCOLN NEBR 1960



USDA-SCS LINCOLN, NEBR. 1960

WATER SUPPLY FORECASTS

AS OF MARCH 1, 1960 - WATERSHED XI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR +	NORMAL
	YELLOWSTONE RIVER					
1915	Corwin Springs (at)	Apr-Sept	1443	73	1785	1980
		Apr-July	1172	71	1499	1649
1925	Livingston (near)	Apr-Sept	1646	73	1630#	2252
		Apr-July	1322	71	1368#	1863
2145	Billings (at)	Apr-Sept	3266	77	4094	4261
		Apr-July	2769	76	3608	3657
3090	Miles City (at) (13)	Apr-Sept	5038	75	5238	6707
		Apr-July	4421	75	4731	5884
3295	Sidney (near) (13)	Apr-Sept	5083	73	4760#	6921
		Apr-July	4501	73	4393#	6137
	SHIELDS RIVER					
1935	Clyde Park (at)	Apr-Sept	158	142	50.0#	111
		Apr-July	143	139	46.6#	103
	ROSEBUD CREEK					
2045	Absarokee (near) (12)	Apr-Sept	296	111	252#	267
		Apr-July	237	110	202#	216
	STILLWATER RIVER					
2050	Absarokee (near) (12)	Apr-Sept	645	104	530#	620
		Apr-July	541	103	445#	523
	CLARKS FORK RIVER					
2075	Chance (at)	Apr-Sept	490	79	648	617
		Apr-July	442	80	601	552
2085	Edgar (at)	Apr-Sept	524	80	652	652
		Apr-July	466	81	589	575
	ROCK CREEK					
2095	Red Lodge (near)	Apr-Sept	108	96	97.5#	112
		Apr-July	82.9	96	75.4#	86.3

(12) Observed flow plus change in storage in Mystic Lake.
(13) Observed flow plus change in storage in Buffalo Bill & Boysen Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF FEBRUARY 29, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
2040	Mystic Lake	20.8	6.1	8.5	8.6

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA
AS OF

MARCH 1, 1960

WATERSHED XI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
9D1	Camp Senia	7890	2/16	18	3.6	5.9	6.0	7
10E3	Canyon	7500	3/1	35	7.4	12.7	13.4	13
10D7	Cooke City	7400	2/29	22	4.2	7.5	7.8	15
10D5	Crevice Mountain	8400	2/29	23	4.4	7.5	8.2	15
10D4	Devil's Slide	8100	2/28	65	19.0	19.9	16.3	15
10E6	East Entrance	7000	3/1	24	5.3	11.4	11.6	9
10D3	Hood Meadow	6600	2/27	32	7.1	8.2	7.2	15
10D6	Independence	8000	2/17	40	9.0	-	15.5	7
10E4	Lake Camp #1	7850	3/2	27	4.8	8.1	9.5	13
9E1	Lodgepole	8200	2/29	25	5.0	9.9	-	-
10E1	Lupine Creek	7300	2/29	27	5.6	9.5	10.0	14
10D1	New World	6700	3/1	35	8.8	10.6	8.7	14
10E2	Norris Basin	7500	3/1	30	4.0	9.1	9.4	10
10C3	Porcupine	6500	2/29	23	4.8	5.3	5.7	15
10E5	Sylvan Pass	7100	3/1	32	7.6	14.1	13.2	14
10E7	Thumb Divide	7900	3/1	39	10.3	16.7	21.2	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

STATUS OF RESERVOIR STORAGE

March 1, 1960

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET			
			1960	1959	1943-57 Average	Yrs.
MISSOURI RIVER BASIN - WYOMING						
Shoshone River	Buffalo Bill	440.0	122.5	0.0	235.4	15
Wind River	Boysen	560.0AC	140.5	78.2	448.6**	5
Wind River	Pilot Butte	31.6	15.9	9.7	13.3	15
Bull Creek	Bull Lake	152.0	37.8	49.0	63.2	15
Belle Fourche	Key Hole	190.0AC	0.0	0.0	10.9**	5
MISSOURI RIVER BASIN - NORTH DAKOTA						
Heart River	Lake Tschida	68.7AC	43.5	42.3	53.1**	7
Heart River	E. A. Patterson	5.6AC	4.0	3.7	3.8**	6
Missouri River	Garrison Lake	18100.0AC	3563.2	2478.0	-	-
James River	Jamestown	220.0AC	8.1	12.5	-	-
MISSOURI RIVER BASIN - SOUTH DAKOTA						
Belle Fourche	Belle Fourche	185.2AC	34.3	39.3	106.8	15
Cheyenne River	Angostura	90.0AC	19.2	44.1	41.4**	6
Cheyenne River	Deerfield	15.1AC	1.2	8.9	12.9**	10
Grand River	Shadehill	84.0AC	69.7	71.2	76.4**	5
Missouri River	Ft. Randall	3800.0AC	3857.0	2314.5	1376.3**	3
Missouri River	Gavins Point	320.0AC	468.0	289.0	-	-
Missouri River	Oahe	17000.0AC	994.0T	696.0T	-	-
Cheyenne River	Pactola	55.0AC	24.1	18.7	-	-

** Average for years of record shown in 1943-57 base period.
AC Active Capacity; USBR Billings.
T Total Storage.

WYOMING SNOW SURVEYS ABOUT MARCH 1, 1960

			Current Information			Past Record		
						Water Content (In.)		
No.	Snow Course Name	Elev.	Date of Survey	Snow Depth (In.)	Water Content (In.)	Last Year	15-Year Average 1943-57	Years Record Used In Average
LOWER YELLOWSTONE - WIND RIVER								
9F12	Big Warm	8800	2/27	26	5.0	8.1	7.2**	5
9F4	Burroughs Creek	8800	2/29	28	6.0	13.3	13.4**	11
9F10	Dinwoodie	10000	3/1	34	8.0	9.7	10.8**	11
9F9	Dry Creek	9500	3/1	20	3.7	5.7	4.5**	11
9F6	DuNoir	8750	2/27	21	4.1	6.7	7.8	19
9F7	Geyser Creek	8500	2/28	20	4.0	6.0	7.0**	11
9F8	Little Warm	9500	2/28	43	10.7	14.1	14.7**	11
9F14	Sheridan R.S. #2	7500	2/29	20	3.7	5.8	6.1**	5
9F3	T-Cross Ranch	8000	2/29	17	3.1	6.0	6.8	19
#10F9	Togwotee Pass	9600	3/2	64	19.1	26.8	26.4**	10
LOWER YELLOWSTONE - POPO AGIE RIVER								
8G2	Blue Ridge	9500	2/23	32	5.3	5.8	11.2*	20
8G5	Bruce's Camp	6500	2/23	23	2.9	3.2	-	2
9G3	Hobbs Park	10000	3/4	42	11.3	11.3	15.8**	11
9G4	Mosquito Park R.S.	9500	3/4	26	5.8	4.8	7.1*	16
8G1	Sawmill Glade	8500	2/23	33	4.7	5.1	6.9	20
#8G3	South Pass	9000	2/23	36	7.1	8.4	13.2	20
9F11	St. Lawrence R.S.	9000	3/3	19	3.8	4.6	6.1*	16
9G2	Trout Creek	8400	3/4	25	5.6	4.4	5.1**	11
LOWER YELLOWSTONE - OWL CREEK								
+#9F19	Kirwin	11000	2/28	51	13.5E			
8F1	Owl Creek	8700	2/23	32	6.9	5.0	4.6**	11
LOWER YELLOWSTONE - GREYBULL RIVER								
+#9F19	Kirwin	11000	2/28	51	13.5E			
LOWER YELLOWSTONE - SHOSHONE RIVER								
9E4	Carter Mountain	7800	2/24	21	4.2	3.4	-	3
#10E6	East Entrance	7000	3/1	24	5.3	11.4	11.0**e	11
+9E5	Ishawooa	9200	2/28	125				
#10E5	Sylvan Pass	7100	3/1	32	7.6	14.1	13.1*	16
+9F18	Younts Peak	8500	2/28	80	26.0E			

* Average is for 15 years of data within and adjacent to the 1943-57 period.
** Average of all past data.
# Adjacent drainage.
+ Aerial stadia marker.
e Partial estimate during the 1943-57 base period; E Estimated Water content.

WYOMING SNOW SURVEYS ABOUT MARCH 1, 1960

			Current Information			Past Record		
						Water Content (In.)		
No.	Snow Course Name	Elev.	Date of Survey	Snow Depth (In.)	Water Content (In.)	Last Year	15-Year Average 1943-57	Years Record Used In Average
LOWER YELLOWSTONE - NOWOOD CREEK								
#7F1	Bear Trap	8000	3/2	24	4.1			
#7F2	Canyon Creek	7400	3/3	39	8.8			
7E25	Cold Springs Camp	8700	2/25	24	4.9	8.8	-	3
7E24	Medicine Lodge Lakes	9500	2/25	37	8.0	10.9	-	3
#7E8	Munkres Pass	9400	2/29	32	6.8	7.2	7.4**	4
#7E27	Onion Gulch	8100	3/2	29	5.2	9.5	-	3
7E26	West Tensleep	9075	2/28	40	9.5E	11.2	-	3
LOWER YELLOWSTONE - SHELL CREEK								
#7E21	Bald Mountain	9600	2/29	62	17.6	10.8	15.8**	4
#7E20	Beaver Tongue	9200	2/29	58	16.2	19.8	15.0**	4
+#7E18	Bone Spring	9200	2/28	49	13.0E	16.4	13.0**	4
#7E17	Granite Pass	8950	3/2	48	13.2	15.3	13.0**	4
+7E23	Shell Creek	9600	2/28	45	12.5E	13.1	-	3
LOWER YELLOWSTONE - PORCUPINE CREEK								
7E31	Five Springs Falls	7500	3/1	25	5.4	10.8	5.8**	4
#7E30	Medicine Wheel	9000	2/29	51	15.2	19.0	13.1**	4
LOWER YELLOWSTONE - TONGUE RIVER								
#7E20	Beaver Tongue	9200	2/29	58	16.2	19.8	15.0**	4
7E32	Big Goose #2	7700	2/25	30	6.6	7.2	5.9**	4
+#7E18	Bone Spring	9200	2/28	49	13.0E	16.4	13.0**	4
7E33	Burgess R.S. #2	7900	3/1	31	7.6	8.7	6.0**	4
+7E34	Dome Lake #2	8800	2/28	35	7.5E	8.6	7.7**e	4
+7E14	Gloom Creek	9300	2/28	48	13.0E	13.1	10.0**	4
#7E17	Granite Pass	8950	3/2	48	13.2	15.3	13.0**	4
7E11	Sibley Lake	8000	3/2	39	9.2	11.7	8.0**	4
+7E12	Sucker Creek	9000	2/28	45	12.5E	12.8	9.3**	4
7E10	Steamboat Point	7500	3/2	31	7.6	9.0	5.7**	4
7E13	Wood Rock G.S.	8500	3/2	38	9.3	10.1	8.3**	4
LOWER YELLOWSTONE - POWDER RIVER								
#7F1	Bear Trap	8000	3/2	24	4.1			
#7F2	Canyon Creek	7400	3/3	39	8.1			
+7E36	Cloud's Peak	10000	2/28	34	7.5E			
#7E28	Muddy Creek G.S.	7800	2/29	15	3.4	5.0	-	3
#7E8	Munkres Pass	9700	2/29	32	6.8	7.2	7.4**	4
#7E27	Onion Gulch	8100	3/2	29	5.2	9.5	-	3
7E5	Soldier Park	8700	2/26	20	4.3	5.5	4.0**	8
7E6	Sour Dough	8500	2/26	22	4.1	6.3	-	3

** Average of all past data.
# Adjacent drainage - + Aerial stadia marker.
e Partial estimate during the 1943-57 base period; E Estimated water content.

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
  Region I, Missoula, Montana

U. S. Geological Survey
  Helena, Montana

U. S. Army Corps of Engineers
  Portland, Oregon
  Seattle, Washington
  Omaha, Nebraska
  Riverdale, N. D.

U. S. Indian Irrigation Service
  St. Ignatius, Montana

U. S. Weather Bureau
  Helena, Montana

U. S. Fish & Wildlife Service
  Red Rock Lakes Refuge
  Monida, Montana

U. S. Bureau of Reclamation
  Billings, Montana
  Boise, Idaho

Montana Power Company
  Butte, Montana

Agricultural Experiment Station
  North Montana Branch Station
  Havre, Montana

Montana State Highway Dept.
  East Glacier, Montana

National Park Service
  Yellowstone National Park
  Glacier National Park

Montana Experiment Station
  Montana State College
  Bozeman, Montana

Bonneville Power Administration
  Portland, Oregon

Montana State School of Forestry
  Montana State University
  Missoula, Montana

Soil Conservation Service
  Montana, Wyoming, Idaho

Soil Conservation Districts
  Montana Counties

Johnson Flying Service, Inc.
  Missoula, Montana

Water Rights Branch
  Dept. of Lands & Forests
  Victoria, British Columbia

Department of Northern Affairs
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Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

◆

"The Conservation of Water begins with the Snow Survey"